THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND, Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

MEMBERS and Associates elected at the June Meeting of the Institute, in Philadelphia, are hereby informed that the Council desires a prompt acceptance of election, accompanied by the payment of dues for one year. Notification of election, with blank form of acceptance, was mailed on July 1st to all elected at the Philadelphia meeting.

In case of the acceptance not being received by the Secretary by August 5th, the sending of the ENGINEERING AND MINING JOURNAL will cease, and when the acceptance is delayed till after the next regular meeting (October), such acceptance must be approved by the Council before the name of the member or associate elected can be entered on the lists of the Institute.

EASTON, Pa., July 25, 1876. THOMAS M. DROWN, Secretary.

MR. HEWITT'S ADDRESS—IMPORTANT CORRECTION.

IN the Centennial Address of Mr. HEWITT before the Institute of Mining Engineers, as published in pamphlet form, and sent to members, a serious typographical error occurs on page 9. The percentage contributed by the United States to the world's product of iron is 18.1 instead of 13.1 per cent., as may be proved by calculating from the quantities as given. This mistake was not in the address as published in the ENGINEERING AND MINING JOURNAL. As the pamphlet, however, is likely to be much used for reference, our readers who have it will do well to correct the above error at once. Some of the first copies printed, gave on page 8 the product of bituminous coal as 26,000, instead of 26,000,000 tons. *

"MOLLY MAGUIRES."

THE conviction of all the "Mollie Maguire" murderers yet tried, has created a feeling of the utmost satisfaction among all classes, and calls for more extended remark than our space this week will allow; we shall, on another occasion, review the case, and place upon record in our columns the principal points of interest connected with it.

AMERICAN INSTITUTE FAIR.

THE Forty-fifth Exhibition of the American Institute is announced in our advertising columns to open September 6th, and increased awards are also promised. The Institute Fair has, undoubtedly, done good service in the past, bringing together machinery for comparison, and, nominally, for competitive tests. Unfortunately, the Administration has not, heretofore, appreciated the capabilities and opportunities of the Fair, and instead of making a thorough series of tests, under the direction of skilled experts, who could show the actual performances of the machinery exhibited, and make comparisons with the work of similar machines elsewhere, the Direction of the Institute has usually defeated what should be the real objects of such a fair, and has endeavored, by an indiscriminate distribution of certificates and awards, a species of general puffing, to please everybody, without paying much regard to the merits of the exhibits. While the Centennial may interfere somewhat with the exhibition of machinery, it will be possible, by a better management of the fair, and by the adoption of a more intelligent system of making tests and awards, to make the Fair this year much more successful than it has ever been before.

We invite the attention of manufacturers to this excellent opportunity for exhibiting their productions, and the fact that an unusually large number of visitors from abroad, and from all parts of this country will, undoubtedly, visit the Fair, makes the advantages of exhibition much greater than usual.

THE GERMAN EXHIBIT.

PROFESSOR F. REULEAUX, the General Commissioner for Germany at the Centennial Exposition, has written to the *Nationalzeitung* of Berlin a pungent letter on the present condition of German industry, as illustrated by its exhibit at Philadelphia. His severe criticisms have aroused considerable excitement, and many replies have been made through the German press.

Prof. REULEAUX cites three criticisms, which, he confesses, appear to him well-founded. The first is that the dominant principle of German industry at present is "cheap and poor"—cheapness being the end recklessly sought for by the majority of manufacturers, and poor quality of product being its necessary concomitant. The second is, that in the plastic arts and the arts of design, the only inspiration appears to be intense patriotism, to the exclusion of beauty or poetry; and this he condemns particularly, as out of place in an international display. He says: "A feeling of shame creeps over us, as we walk through the Exposition, and contemplate in our department the Germanias, Borussias, Kaisers, Crown Princes, 'Red Princes,' BISMARCKS, MOLTKES, and ROONS, marching in whole battalions, done in porcelain, in *bisque*, in bronze, in zinc, in iron, in clay, painted, worked, embroidered, printed, lithographed, which meet us at every turn. And in the Art Gallery two 'Sedans!' What was the Art Committee thinking of when it accepted these pictures? And again in Machinery Hall: seven-eighths of the space given up, it appears, to KRUPP's giant cannon—'the killing machine,' as it has been called—which stands like a threat amid all the peaceful works sent by other nations! Is this indeed the expression of Germany's 'mission?' Must it not be assumed that Chauvinism and Byzantinism are in full flower among us? Do we not force other nations to this conclusion?"

The third accusation alluded to is that of lack of taste in manufacturers and lack of progress in technical work. Under this head, Prof. R. alludes to the efforts of the German *Gewerbemuseum*, and the small co-operation received by the Minister of Commerce from the trades themselves in his earnest attempt for their improvement. "'From all nations represented in the Exposition,' say the critics, 'we have found something to learn: only in Germany, nothing.' Hard, but almost wholly true!" exclaims the German Commissioner.

In conclusion, he promises to analyze in future articles the consoling features of the case, but reiterates his sorrowful conviction that in regard to the three general criticisms above mentioned, no thorough contradiction is possible. His final words are:

"I can only express the wish that right many German manufacturers may come over, to see how much we have to learn and how much to forget."

This sort of talk is not what "patriotism" expects: but, it will act like a tonic upon the really healthy German blood. We think Prof. REULEAUX is too severe—or, at least, that his article, taken by itself, without the "consolation" which is to follow, is almost too bitter even for a tonic. It is easy to see that the German industry is not fairly represented at Philadelphia; but the causes may be found chiefly in three things, for none of which Germany is to blame. The first was the want of commercial prospects to stimulate manufacturers to the expensive work of exhibiting their wares on this side the Atlantic. The second was the universal doubt as to the really national (and still more the international) character of our Exhibition, which politicians, demagogues, cavillers, and jealous rivals spread through the world, sowing it most of all in countries which, like Germany, are in intimate intellectual connection with our own, through letters and newspapers. What American does not blush to remember how we "backed and filled" over this subject in the presence of the nations—how we invited them to come, and then warned them that it was a purely private stock speculation; how they could not even be guaranteed against the seizure of the goods on exhibition for the debts of the concern? The third cause is the industrial depression which affects Germany, and which, together with the temporary check which "patriotism" has given to all the arts, may be referred to the war. War certainly does bring destruction to the fruits of peace. There was a time when French art ran wild with the fever of Napoleonic conquest, and that was the period also when Germany, overthrown in arms, gathered strength in literature and art. Now France, learning with startling rapidity the lessons of defeat, is profiting thereby, while Germany is exposed to the perils of victory. We will not believe, however, that the spirit of war is to be the guiding spirit of Germany. Concerning the BISMARCK and Sedan business, as a matter of taste, Prof. R. is quite right, and his indignation would apply as well to other displays by other nations; such, for instance, as our hideous "Battle of Gettysburg." But as to KRUPP's big cannon, we don't agree with him. Call it "the Peace-keeper," instead of "the Killing-Machine," and regard it as the type of a nation of ponderous power, available for defence, but not designed for wanton aggression—*heavy ordnance, threatening nobody*—and we think it no bad emblem of the German Empire. *

CENTENNIAL EXCURSION OF THE PENNSYLVANIA RAILROAD.

THERE has been no single feature of the Centennial Exhibition more pleasing, or we believe more productive of permanent beneficial results, than the universal spirit of hospitality with which foreigners from every country have been received here. Everywhere our mines, our furnaces, and other metallurgical works, our machine shops, railroads, and all other works of interest have freely offered facilities to our foreign visitors, to examine and study their every detail; and the books and other private sources of information, have not been

withheld from the earnest student. The immediate result of this course has been the implanting of a most favorable impression of Americans in general, in the minds of a very influential class; and while this full insight into the resources of the country, and intimate acquaintance with the actual extent and business management of our works has removed impressions gained, generally, from published descriptions of a former state of things, much more immature and less perfect than that obtaining to-day. The future results of these favorable impressions of the great natural resources of this country, and of the substantial progress that has been made here in every branch of industry, will certainly be a truer appreciation of these facts abroad, and the encouragement of a desire among the better classes of foreign citizens to come among us and invest their capital in a field which they perceive offers not only natural advantages unequalled elsewhere, but also the security and inducements which skillful engineering and careful business management can confer. While we believe the facilities which have been tendered to foreigners, to inform themselves of these facts, have been offered in the simple spirit of true hospitality, we, as journalists, cannot but refer to the ultimate advantages that will unquestionably result from this generous treatment of our visitors.

Particular force has been given to these remarks by the courteous act of the Pennsylvania Railroad Company, that recently entertained, in the most princely manner, the Judges and Commissioners to the Centennial by giving them an excursion, lasting throughout an entire week, and during which they visited in succession the magnificent railroad machine shops at Altoona, Pa., the Cambria Iron Works at Johnstown, Pittsburg, the Oil Regions, Erie, Pa., Buffalo, N. Y., Niagara Falls, Watkins Glen, N. Y., Williamsport Lumber Mills, Harrisburg Steel Works, and innumerable minor objects of interest along the route. The excursion party, numbering from 130 to 150, was composed of influential representatives of nearly every country, as will be seen from a perusal of the following list of names of the guests:

W. H. Brown, Engineer M. W. P. RR., Phila.
Rich. Peters, Jr., U. S. Commiss'ner, Georgia.
James Dancer, England.
Major Noble, Royal Artillery, Judge, Eng.
E. H. Birley, England.
David McHardy, Judge, Aberdeen, Scotland.
John Anderson, LL.D., Judge, England.
Dr. J. L. Le Conte, Philadelphia.
Sir Redmond Barry, President Com., Victoria.
Julius Schiedmayer, Judge, Germany.
Mr. J. Mansel Brett, England.
Mr. Ernest Charington, England.
Dr. Ernst Fleischl, Judge, Austria.
Mr. F. T. Hodgkinson, England.
Mr. Frederick A. Paget, Judge, England.
Mr. D. Watterson, Correspondent, Victoria.
Chas. Robinson, Secretary, New South Wales,
Prof. T. C. Archer, Commissioner, England.
J. S. Bancroft, of Wm. Sellers & Co., Phila.
Robert Thomson, Commissioner, Jamaica.
Mr. B. Doepke, Commissioner and Royal Engineer, Germany.
Bruno Kniffler, Asst. Engineer, Germany.
J. W. Schwedler, Commissioner and Royal Engineer, Germany.
Prof. Gustav Herrmann, Judge, Germany.
E. Favre Perret, Judge, Switzerland.
Paul V. Grolp, Correspondent, Germany,
Mr. Chas. Blanck, Com. & R. Eng'r, Germany.
R. H. Soden Smith, M. A., F. S. A., South Kensington Museum, Judge, England.
Dr. R. Koenig, France.
Rene Millet, Secretary Commission, France.
R. Wa'l, Editor Stockholm *Daily News*, Sweden.
Dr. Harald Wieselgren, Editor Stockholm *Illustrated News*, Sweden.
Dr. Chas. Austin, Correspondent, England.
Dr. G. Seelhorst, Judge, Germany.
Gaston Berardi, Correspondent, Belgium.
Dr. Oscar Salomon, *Nat. Z-tung*, Berlin.
W. H. Wilson, Consult'g Eng'r, P.RR., Phila.
Capt. D. Torrey, Chief of Bureau, Centennial Commission, Philadelphia.
Henry Pettit, Chief of Bureau, Centennial Commission, Philadelphia.
F. W. Jackson, Gen. Sup. United Railroads of New Jersey, Jersey City.
E. Y. Townsend, President Cambria Iron Co., Philadelphia.
Sam'l Davenport, Commissioner, S. Australia.
J. Van Bree, Commissioner, Belgium.
Paul Marlin, Commissioner, Belgium.
Aug. Gobert, fils, Min. Eng'r, Judge, Belgium.
Gerhard Gade, Commissioner, Norway.
Alphonse Lesne, Capt. Commandant Artillery, Judge, Belgium.
John McIntyre, Commissioner for Victoria, Australia.
Emile Berger, Civil Engineer, Luxembourg.
J. C. Fellner, Germany.
W. A. E. West-Erskine, Com., S Australia.
Frederic Leduc, Mining Engineer, France.
Prof. E. T. Cox, State Geologist, Judge, Ind.
R. P. Rothwell, *Engineering and Mining Journal*, New York.
C. H. Harding, Correspondent, England.
J. Gody, Commissioner and State Architect, Belgium.
Paul Liptay, *Hungarian Journals*, Hungary.
Shioda Mashasi, Commissioner, Japan.
Prof. L. Nicholsky, Mining Engineer, Russia.
Emil Brugsch, Commissioner, Judge, Egypt.
D. Wywodzoff, M.D., Russia.
Capt. A. Von-Der Howen, Imperial Russian Guard—Artillery, Russia.
Prof. Nicolas N. Petroff, Judge, Russia.
Eugene Zelenkoff, Commissioner, Russia.
L'eut.-Gen. Saigo Tsukumichi, Commissioner, Japan.
Lieut. Hidaka Ziro, Japan.
H Danufelt, Sweden.
Aug. Lenhardtson, Civil Engineer, Sweden.
Alex. D. Stockton, Philadelphia.
L. Count Della Sala, Turkey.
T. Count Della Sala, Turkey.
Count Fredrik Posse, Commissioner, Sweden.
Baron O. Hermelin, Art Commiss'ner, Sweden.
Count Fredrik Wachmeister, Sweden.
Axel A. W. Berg, Sweden.
Henry P. Welch, Commissioner, Tasmania.
Gottfried Berg, Proprietor Porphyry Works, Sweden.
G. Unden, Mechanical Engineer, Sweden.
Dr. K. M. Thorden, University, Upsal, Sweden.
Count Del Donadio, Commissioner and Judge, Spain.
Alvaro de la Gandara, Com. Judge, Spain.
Col. Juan J. Marin, Royal Commissioner and Judge, Spain.
Dietz Monnin, Jr., Francc.
Dietz Monnin, Judge, France.
Fr. Wenceledes Engineer, Austria.
Paul Regnard Engineer, France.
John A. Wilson, Civil Engineer, Philadelphia.
John F. Blandy, Min. Engineer, Philadelphia.
Wilson Loyd, Banker, Philadelphia.
Prof. E. H. Von Baumhauer, Commissioner & Judge, Netherlands.
Dr. E. M. Von Baumhauer, Secretary, Netherlands.
M. Beretta, Netherlands.
A. L. H. Obreen, Civil Engineer, Netherlands.
Francois Geispitz, Russia.
Artura Ibanez, Mexico.
Lourenco Malheiro, Mining Engineer, Commissioner, and Judge, Portugal.
Geo. S. Dwight, Correspondent *Engineering & Mining Journal*, New York.
W. Lorenz, Chief Engineer P. & R. RR., Philadelphia.
S. M. Felton, Pres't Penn. Steel Works and Member Centennial Board of Finance, Philadelphia.
T. C. Clarke, Civil Engineer, Philadelphia.
Prof. Emile Levasseur, Member of Institute, Judge, France.
J. B. Halvorson, Editor, *M.rgenbl.det*, Christiania, Norway.
Prof. F. Reuleaux, Commissioner General and Judge, Germany.
Prof. G. F. Barker, University of Pennsylvania, Philadelphia.
John E. Icely, Civil Engineer, Switzerland.
Col. Rich, Judge, England.
Jas. McCrea, Sup't Middle Division P. RR., Harrisburg.
Emil Burgin, Civil Engineer, Switzerland.
Edwin Rockstroh, *Leipziger Zeitung*, Germany.
Prof. Otto Torrel, Judge, Sweden.
Arthur Von Studnitz, Germany.
W. Hoffstedt, Mechanical Engineer, Sweden.
Arwid Gumælius, Editor *Workman's Magazine*, Sweden.
J. M. Gregory, LL.D., Judge, Illinois.
Don Daniel De Cortazar, Judge, Spain.
Prof. Franz Kupelwieser, Austria.
Eurique Borrel, Chief of Bureau, Spain.
Dr. F. Migerka, Commissioner Gen'l, Austria.
J. Laidlaw, Canada.
G. Haentzchel, Civil Engineer, Germany.
G. Clinton Gardner, Gen. Sup't P. RR., Altoona.
Leopold Strohmayer, Engineer, Austria.
Mr. Chas. Cavens, Capt. of Artillery Belgium.
Prof J. Batalha Reis, Com. & Judge Portugal.
Dr. Josua Lindahl, Secretary to Commission, Sweden.
J. Diefenbach, Com. and Judge, Germany.
Jos. M. Wilson, Engineer, Bridges and Buildings, P. RR., Philadelphia.
M. N. Forney, *Railroad Gazette*, Philadelphia.
V. M. de Calry, Altoona.
J. Dutton Steele, Civil Engineer, Philadelphia.
D. C. Sayers, Altoona.
Augustus Dowdell, Philadelphia.
Prof. C. J. Meyerberg, Commissioner of Education, Sweden.
Rich. Akerman, Judge, Sweden.
P. von Tunner, Austria.
Ludwig von Tunner, Austria.
John Dalzell, Solicitor P. RR., Pittsburg.
Jas. A. Hutchinson, A. Valley RR., Pittsburg.
Felix R. Brunot, A. Valley RR., Pittsburg.
Uri Updegraff, A. Valley RR., Pittsburg.
John Updegraff, A. Valley RR, Pittsburg.
John Scott, President A. Valley RR, Pittsburg.
Maurice Scott, A. Valley RR., Pittsburg.
David McCargo, Gen'l Supt. Allegheny Valley RR., Pittsburg.
E. D. Nettleton, A. Valley RR., Pittsburg.
A. A. Jackson, A. Valley RR., Pittsburg.
Wm. P. Shinn, Vice Pres. A. V. RR., Pittsburg.
Thos. M. King, Supt. A. V. RR., Pittsburg.
Chas. P. Hatch, Supt. Empire Pipe Lines, Oil City.
W. J. Brundred, Supt. Empire Green Line, Oil City.
W. Brugmann, Germany.
C. Skalkovsky, Mining Engineer, Russia.
Joel Cook, Correspondent, Philadelphia.
A. J. Cassatt, 3d V. Pres. P. RR., Philadelphia.
Frank Thomson, Gen. Manager P. RR., Philadelphia.
Hjalmar Wessberg, Sweden.
Sekezawka Akekio, Japan.
Edward Elias, Egypt.
Lieut. Rich, England.
C. J. Hepburn A. Valley RR., Oil City.
J. H. Cundall, Engineer British Com., England.
W. Hay, England.
Wm. A. Baldwin, General Sup't P. & E. RR., Williamsport.
John E. Payne, Eastern Manager Anchor Line, Erie.
E. T. Evans, Western Manager Anchor Line, Buffalo.
J. W. Reynolds, Sup't Western Division P. & E. RR., Erie.
E. S. Harrar, Gen. Ticket Agent P. & E. RR., Williamsport.
T. N. Ely, Sup't Motive Power P. RR., Altoona.
R. B. Lowry, Captain U. S. Navy, Erie.
W. P. Taylor, Supt. Buffalo Div. L. S & M. S. RR., Buffalo.
C. M. Fairbanks, Correspondent, Cleveland.
Thomas Gucker Supt. Eastern Div. P. & E. RR., Williamsport.
Robt. Neilson, Sup't Elmira & Canandaigua Divisions, N. C. R. W., Elmira.
Isaac M. Schermerhorn, Gen. Western Agent, N. C. R. W., Buffalo.
Chas. H. Fisher, Chief Engineer, N. Y. C. & H. R. RR., New York.
Wm. F. Lockard, Sup't Philadelphia Division, P. RR., Philadelphia.
J. Chester Wilson, Altoona.
Rob't Pitcairn, Sup't Pittsburg Div. P. RR., Pittsburg.
Daniel McCool, Ass't Sup't Western Div. N. Y. C. and H. R. RR., Rochester.
Total number, 178.

The train provided represented all the comfort and convenience of modern railway travel, including that peculiarly American invention, a lunch car which bridged all the spaces between hotels with a perpetual banquet, rendering hunger or thirst impossible, and even the heat of July not only endurable but enjoyable when tempered with ice in various forms.

The substantial roadway of the Pennsylvania Railroad, with its stone ballast, which secures at once a perfect drainage and freedom from dust, its ample sidings, its steel tracks and the admirable general management, attracted much attention. The extensive shops at Altoona, wherein iron and timber are converted, as with the wave of a magic wand, into rolling stock to meet the vast requirements of the road testified to the exercise of engineering skill and marvellous mechanical ingenuity, as well as of careful business management. The great works of the Cambria and the Pennsylvania Steel Companies illustrated the most improved methods of converting, hammering, and rolling, and there was much note-taking on the subject among foreign engineers. The lumber interests at Williamsport, where mills produce two hundred and fifty millions of feet annually, proved very interesting also, and were carefully examined.

Probably no industry was more thoroughly novel and surprising to the gentlemen from abroad than that seen in the Oil Region, where petroleum is sucked from mysterious depths and forced through miles of small iron pipes to tanks at the railway stations, whence it is loaded and sent to the markets of the world. During their visit to this section, they saw in flames a reservoir, containing one million gallons of petroleum, that had a few hours before been struck by lightning and ignited.

The beautifully diversified valleys of New York, the hills and Alleghenies of Pennsylvania, with the Genesee Falls, Watkins Glen and Niagara, afforded a treat in the way of scenery which made the trip as thoroughly delightful as in other matters it was interesting and instructive. The guests carried home with them an intelligent and enlarged conception of the resources and management of this great railway, and certainly the royal manner in which its hospitalities were dispensed must have given them a new idea of the possibilities of the American railway system.

To Mr. SCOTT, the President of the Pennsylvania Railroad, to whom the inception of this admirable excursion belongs, and to his courteous and able officers who so well executed his plans, were freely given, by those present, the most unbounded praise for this novel and instructive trip. It was a frequent remark that nowhere but in America was such an entertainment possible, and we feel very certain that when most of the wonders of the great Centennial Exhibition shall have passed into the oblivion of years this enjoyable and instructive excursion will be vividly remembered by those who took part in it, and it will long be cited as an example of American hospitality.

NEW PUBLICATIONS.

BOOKS RECEIVED.

THE FATIGUE OF METALS. LUDWIG SPANGENBURG. D. VAN NOSTRAND, New York. Price 50c.

MECHANICAL THEORY OF HEAT. By R. S. MCCULLOCH. D. VAN NOSTRAND. Price $3.50.

HAND BOOK OF MODERN FIRE ENGINES. By S. ROPER. CLAXTON, REMSEN & HAFFELFINGER, Philadelphia. Price (morocco tucks) $3.50.

BUREAU OF STATISTICS OF LABOR OF MASSACHUSETTS. 7th Annual Report.

ABSTRACTS OF PAPERS. JAMES FORREST, Esq., Secretary, Institute of Civil Engineers, London.

STEAM CANAL BOATS VS. HORSE BOATS.—One singular effect of the low rates prevailing for the carriage of merchandise is, that the Baxter steam canal boats are not running this Summer—the proprietors maintaining that they cannot pay expenses. It was claimed when they were first used that steam power was much cheaper than animal. It can hardly be that the owners of horse boats run them for pleasure, and yet they are running constantly on the Erie canal, notwithstanding the idleness of the Baxter boats.

MICHIGAN SALT PRODUCT.—East Saginaw, Mich., July 19. The total amount of salt inspected during the month of June, in the Michigan salt district, was 179,489 barrels, and the total amount for the season to July 1, 589,165, an increase over the amount during the same time last year of 193,006 barrels. The salt product this year, it is estimated, will reach 1,500,000, barrels, or 500,000 barrels more than last year.

HYDRAULIC MACHINERY AT THE PHILADELPHIA EXHIBITION.—NO. 4.

Special Correspondence of the Engineering and Mining Journal.

THE NORWALK PUMP.

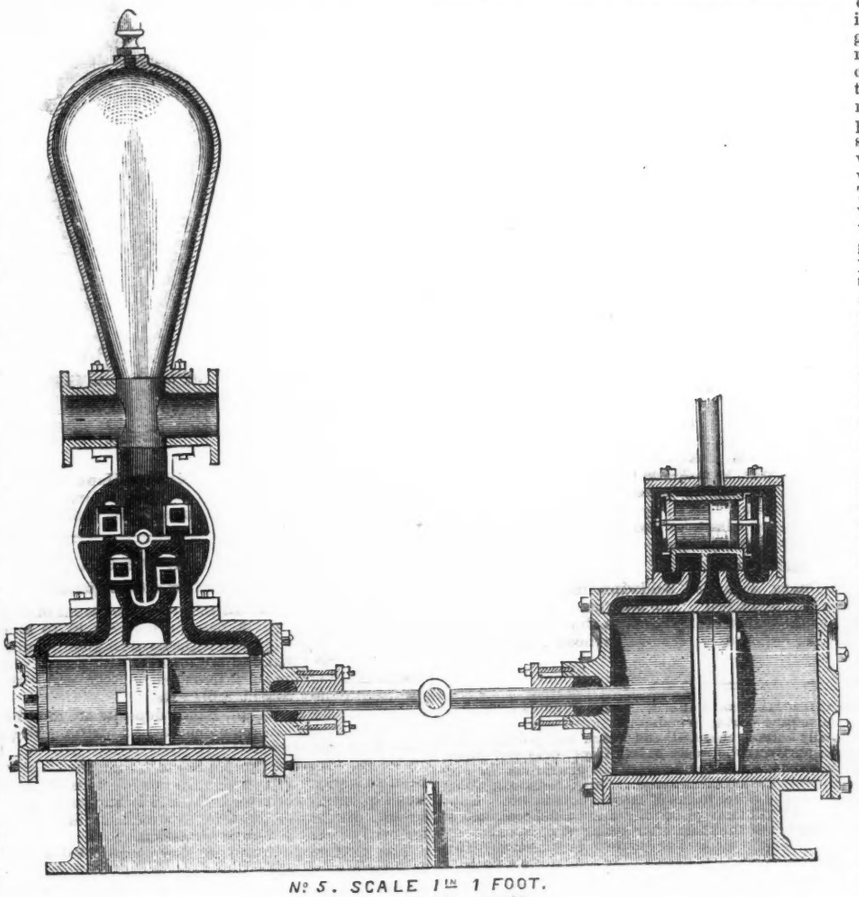
THIS pump has its steam valves moved by means of an auxiliary cylinder similar in arrangement to the one just described. The water valves are circular poppet valves made of bronze, the seats being of the same material. Both the delivery and suction valves are in one box, which is placed above the water cylinder, one set being right above the other. The water cylinders are fitted with bronze removable hinges.

NIAGARA PUMPS.

Two makers of this pump are in the field with their exhibits. One is C. B. HARDICK and the other N. HUBBARD, both manufacturing in Brooklyn, N. Y. The difference between the pumps made by these two makers lies mainly in the method of working the steam valves. The Hardick pump, which has already been illustrated in these columns, has the cylinders set far enough apart to permit a horizontal arm to be keyed to the piston rod center to which is fastened a horizontal connecting rod which is at the same level as the axis of the cylinders. This connecting rod works a vertical lever arm whose upper extremity is fastened to a pivot which passes through the upper part of the valve chest on the steam cylinder. A short lever on this pivot is loosely connected with an ordinary shell valve in the steam chest. The exterior vertical lever arm is made so that its length can be changed as to allow the lap of the valve to be changed at will.

The water valves are placed in a short cylinder which is bolted to the top of the water cylinder. This valve cylinder has its axis at right angles to that of the pump, and is covered at both ends by bonnets which are held on by a single central bolt. Both delivery and suction valves are held in rectangular boxes which are cut through this cylinder in the direction of its axis. The valves themselves are made of rectangular blocks of composition metal which loosely fit the separate boxes in which they are contained. The valve and valve seat are perfectly plane, the latter being on the lower side of the boxes. The valves then when put into the pumps are capable of being used without repair until all four faces are worn out, as by simply turning them one quarter way round a new surface is presented without affecting their action at all. In an emergency a square block of hard wood can be used in place of these metal valves. The accessibility to the valve chambers is one of the best features of these pumps. The unscrewing of two bolts permits the two valve chest bonnets to be taken off and then the valves are easily pushed out and the seats exposed.

The Niagara steam pump made by N. HUBBARD uses a different steam valve motion It has an auxiliary cylinder containing a piston, to which is attached the main slide valve. A rod from this piston is moved by an upright tappet arm keyed on to the main piston rod.



No 5. SCALE 1 IN 1 FOOT.

HARDICK'S NIAGARA PUMP.

THE GOULD PUMP.

The Gould Manufacturing Company, of Seneca Falls, N. Y., exhibit quite a number of hand and steam power rotary pumps. They make two general varieties, which differ from each other in the form of cam used. The exterior cases in both kinds consists of irregular shaped cylinders, whose section is that formed by the intersection of two parallel and intersecting cylinders of equal size. One end of this case is cast solid, and the other is bolted on to a flange on the case.

Inside this case are two sets of equal revolving wheels, having radiating cams which interlock from one wheel to the other. The small hand pumps have these internal wheels made with six cams or teeth each. Their section is like that of a deeply cut gear wheel, in which the joints of the teeth are round and larger than their bases. The teeth of one wheel engage with those of the other when the pump is in operation, the two wheels moving outward from below. After disengaging from each other from below, the teeth have bearing surface against the sides of the cylinders, the spaces between the teeth being filled with the liquid which is being raised. When this is brought round to the highest point, the engagement by the teeth of the two wheels forces the larger portion of the liquid out into the delivery pipe, which is here joined to the case. The pumps made for forcing under considerable pressure have the same internal shape to the barrels, the cams on the wheels, however, being different. Three of these are made on each wheel, but their form is such as to be very difficult to describe without a drawing. Those however, who are familiar with the peculiar device on an Isle of Man penny, can get an idea of their general form. They work in each other in the same way as those just described. The mandrils which drive these wheels pass through both ends of the cylinders, while sets of gear wheels serve to communicate motion from the one which is driven by a pulley to the other.

The large frictional moving surfaces, and the want of any special arrangements for keeping these bearing surfaces tight after being somewhat worn, must render their working uneconomical when forcing water to considerable heights or distance, but where simplicity of construction and readiness of working are the chief points considered, they will give good satisfaction.

LA FRANCE AND RUMSEY PUMPS.

The La France pump is made at Elmira, and the Rumsey pump at Seneca Falls, N. Y. Their construction and working does not differ enough from those just described to permit us to speak further of them. The favorite use which is made of all the rotary pumps of the three last makers, is that of throwing water for extinguishing fires; both the La France and Gould Company exhibiting steam fire engines, which are furnished with rotary pumps of their own make.

CENTRIFUGAL PUMPS.

These pumps depend entirely on the principle of centrifugal force for their action. In order to put them in action, it is always necessary that the cases of the pumps should be filled with liquid, which being rapidly rotated by means of radiating fans or arms, is, by the motion acquired, given sufficient force to rise through the only escape provided. The ejection of this water gives rise to a vacuum in the pump, which is instantly supplied by the rising of water from the reservoir which supplies the pump. The admission of air along with the water is always very prejudicial to the good working of these pumps, and generally some special arrangements are provided for collecting and getting rid of any which may find its way into the suction pipes. For the purpose of filling the pumps with water, so that they may be started, a small auxiliary hand or other piston pump is attached. These centrifugal pumps have in one class of work no rivals which can successfully compete with them. This is where it is necessary to raise large quantities of water through comparatively short and unobstructive lifts. Having no valves, and with wide and open passages for the flow of the liquids which they pump, they operate freely when pumping liquids which contain solid foreign substances, even when present in considerable quantity and size. Their use, therefore, in pumping mud, gravel, tan liquor, etc., is quite common. In order to keep the water in the pumps and pipes when stopping for a short time, a foot valve is usually placed on the bottom of the suction pipe, its only office being to close when the pump ceases to operate The flow of water is constant, like that in the rotary pump of best construction.

ANDREWS' PUMPS.

Mr. W. D. ANDREWS, of New York, claims to have been the first inventor of pumps working on the centrifugal principal. His first pumps were made in 1846, and in 1854 the kind which is at present in general use was patented. Mr. ANDREWS now makes his pump in two general forms. The first and oldest has the pump case made of two cast iron cones, one setting within the other, the hitch of the internal cone being greater than that of the outer one. The upper part of the internal cone revolves on a flange-shaped bearing, cast on the interior surface of the portion directly below it. The bases of the inner and outer cones are joined together by a circular pipe-shaped flange, which increases in diameter from its starting point to the place where it discharges into the delivery pipe. To the small end of the outer cone, or more properly cone frustrum, is bolted the suction pipe. To propel the water through the pump, the movable point to the inner cone is provided with a number of paddles on its exterior surface, and whose planes intersect with the cone axis. These paddles nearly touch the inside of the outer cone. The cone-shaped disk is put in motion by a shaft to which it is keyed, and which passes through a stuffing-box in the plate bearing of the disk. When the disk is rapidly revolved, it immediately produces in the water a tendency to fly off at right angles to the common axis of the cones, but being prevented from doing so by the outer cone, it takes an upward motion in the direction of the spiral passage at the base of the cones, which it reaches and fills and then is forced upward into the delivery

pipe. The shaft which turns the disk is driven either by a direct connected engine, or by pulleys and belts.

The new form of pump made by Mr. ANDREWS consists of a short cylindrical case in which revolves a paddle wheel having a hollow center, into which is drawn the water from the suction pipe. The revolution of this paddle wheel drives the water outward into a cavity of increasing size, which forms the sides of the cylindrical case. Motion to the revolving paddles is imparted by a shaft passing through the axis of the cylindrical case.

The two pumps spoken of in our first letter, which supply the waterfall reservoir in the Pump Annex, are each built after one of the two models just described. Their suction and discharge pipes have a diameter of fifteen inches, the latter gradually enlarging to twenty-two inches where they enter the bottom of the iron tank. They are driven by oscillating engines, the power being transmitted to them by means of leather belts and iron pulleys. The pulleys are made with V shaped grooves in which the belts run. The belt running one pump has a continuous V section, while the other pump is run by a flat belt, having on its inside surface, at short intervals, blocks of leather which fit in the V shaped grooves in the pulleys. These blocks are built up of pieces of leather which are fastened together and to the flat belt by rivets. It is doubtful if this kind of belt will prove economical in use.

When running the pump at 400 revolutions per minute, they each discharge about 15,000 gallons of water a minute into the tank above. Considering the amount of water raised and the head, the duty performed is quite large. The expenditure of steam is, however, great, and all that which is supplied to the pump in the annex is concentrated upon the engines of these ANDREWS pumps when they are working.

THE HEALD & SISCO PUMPS.

The pumps which are made by this company at Baldwinsville, N. Y., show one very valuable feature in their construction—that of simplicity. The pump case consists of two circular flat castings, which, when bolted together by a flange on their edges, forms a very shallow cylinder surrounded by an increasing spiral tube, which gradually enlarges to form the delivery pipe to the pump. The motion is imparted to the liquid which is being raised, by means of a hollow disk having four arms, the whole of which revolves in the pump case. One side of this hollow disk is open, and communicates with the suction pipe which joins the pump case on the same side. The other side of the disk is attached to a shaft, by which motion is conveyed to the disk. The arms, which have a square section, carry the liquid in curved lines to their outer ends, where it is delivered into the spiral tube at the outer edge of the case.

To fill the pump with water before starting, some of them are fitted with auxiliary hand force pumps, while the others have them directly connected to the moving shaft, so that when the pump is put in motion, its case and a sufficient amount of the delivery pipe are soon filled with the liquid being raised, and the centrifugal disk then commences to act.

HEALD, SISCO & Co., drive the pump shaft in two ways. One is by means of a simple pulley and belt connection with moving shafting, and which is not at all novel. The other pumps are driven by oscillating engines, connected either directly or by gearing with the main shaft. The advantages of having this form of connection over that of belts and pulleys in many cases, are too obvious to be particularized. The lateral strain which comes on the piston-rods of all oscillating engines, and which is usually provided for by carrying the piston-rods through both piston-heads, thus giving them two bearings, is not used on the HEALD & SISCO pumps. Instead of this arrangement they bolt a stiff yoke on the upper cylinder head, which extends out far enough to permit the piston-rod, which works in this yoke, to make its full stroke without interfering with the end piece of the yoke, which is bolted on to give it stiffness. A special pump is made by this company, which, by having the arms on the hollow disk curved in both directions, admits of the motion being reversed without stopping the flow of the liquid being raised.

PERRY PUMP.

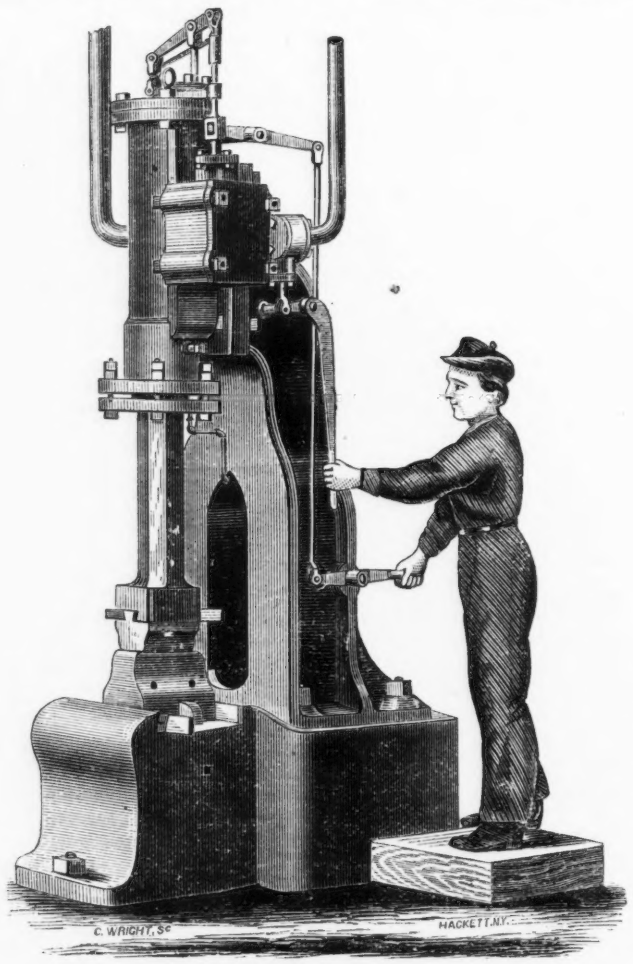
These are made by WHITE, CLARK & Co., of Baldwinsville, N. Y., and are quite similar in design to those just described. The only marked difference in fact, consists in using radial fins instead of hollow arms on the revolving disks. A compact upright non-oscillating engine is used to drive those pumps which are not turned by pulleys.

A NEW SUBSTITUTE FOR ANIMAL CHARCOAL.—Some interesting experiments were made on the 12th of May, at an English sewage works, Wandsworth Road. London, with a new substance, which is practically animal charcoal, and which will probably find extensive use at no distant date in purifying the waste water of dye works and mines. It is the product of a company that owns some 1,200 acres of the district on the Dorsetshire coast where the Kimmeridge shale deposit is found. This is a deposit which is supposed to consist of blubber fish and other forms of marine animal life. However this may be, the shale is found to yield more plentifully than cannel coal, and at less expense, an excellent carbon—one ton of the shale, after giving off 9,000 cubic feet of gas, leaving 11.6 cwt. of residue, which is the sanitary carbon in question. This substance is found to have precisely the same properties and action for all sanitary purposes as animal charcoal that costs from $70 to $90 per ton, and the company hope to be able to produce it for one-fourth the price. The experiments adverted to consisted in running sewage through a layer of the carbon, when the effluent water came out as clear as crystal. A more crucial trial still was made by mixing sewage with a compound of ink dye stuffs in solution, forming a liquid more intractable than would ever be met with in actual drainage operations; but the result was the same, the water running off perfectly clear with no perceptible odor.

DUDGEON'S STEAM HAMMERS.

THE accompanying illustration is of one of the smaller sizes of steam hammers, suitable for forging any size up to 5 inches. It has a 6-inch cylinder, 16-inch stroke, and 1,200 lb. blow. Its cost, with anvil, is about $1,000. Mr. DUDGEON makes sizes of 8, 10, 12, 18, and 20-inch cylinders, with stroke up to 52 inches, and blow up to 11 tons, and claims for them a wider range of capacity, fewer pieces, and, consequently, less liability to get out of order than those now generally in use. They are so arranged that there is no possibility of the ram tearing off the cylinder cover, as is the case with most hammers, where you lose control of it. The rams are all made of wrought iron, with Bessemer steel dies (on the two small sizes). The dies on all are dove-tailed, so that they can be changed with but little trouble, and there has been no pains spared to make them as durable a tool as possible. They can be worked with 50 lb. of steam very rapidly, and are easily controlled.

The high quality of Mr. DUDGEON'S work is too well-known to call for special notice, we have several times had occasion to speak of it in connection with his excellent hydraulic jacks. The excellence and durability of his steam hammers is certified to by such well-known works as the following, where they have long been in use: Messrs. ROACH & Son, Morgan Iron Works, New York; United States Navy Yard, Brooklyn, N. Y.; WOOD & MANN, Steam Engine Works, Utica, N. Y.; South Brooklyn Steam Engine Works, Brooklyn; On-



tario Iron Works, Oswego; Dickson Manufacturing Company, Scranton, Pa.; Delaware, Lackawanna, and Western Railroad, Kingston, Pa.; Messrs. MORRIS & TASKER, Philadelphia; Pennsylvania Railroad Company, Pa., etc., etc.

AUSTRALIAN TIN AT THE PHILADELPHIA EXHIBITION.

Special Correspondence of the Engineering and Mining Journal.

THE last four years has seen a development of deposits of tin ore in hitherto unknown fields, which have been sufficient to almost glut the tin market of the world. The Cornwall deposits of England, and the East India Banca Mines, have hitherto furnished almost all of this metal which has been used—the deposits in several parts of Continental Europe and the United States never having been of any considerable extent.

Both the Cornwall and Banca deposits are found in lodes, or veins, and have to be worked by means of shafts and drifts. The Australian tin ores, as yet, have been mainly worked in their surface deposits, like alluvial gold digging, and it is owing largely to this fact, that the development of the industry has been so rapid. That which, in our Western States and Territories is found in small quantities in river beds, and is known as stream tin, has been found in several districts of Eastern Australia in large quantities, imbedded in drift material of various recent formation.

The northern portion of New South Wales, and the adjacent portion of Queensland, contain the richest deposits of this stream-tin which have yet been found. In Queensland, the town of Stanthorpe is the center of the tin-bearing district. The River Severn, on which Stanthorpe is situated, and its tributaries, nearly all the beds of drift containing tin ore, which have been discovered, are situated. Topographically, the country is very mountainous, a high range on the east and south dividing it from New South Wales, while its whole interior is broken up by ranges and detached peaks, which vary from 2,000 to 3,000 feet in height. Many of the tin deposits in the beds of existing streams are found at elevations of from 2,500 to 2,800 feet. This elevation is such, that at all seasons of the year the temperature of the air is never uncomfortably hot, while, at the same time, the winters are never severe. The rainfall, per annum, varies from 30 to 50 inches. Enough good soil is found, in the shape of alluvial deposits, to admit of the raising of sufficient vegetable products to supply the wants of a mining population.

The geological area in which the tin ore is found, is wholly made up of a number of varieties of igneous granites, which are geographically located on the east by the dividing range before spoken of; on the south, by the watershed of the Severn River; on the west, by slaty rocks, whose geological position has not yet been thoroughly determined. The northern boundary of this field is the range of mountains forming the southern watershed of the Condamine River. At a point near the Severn River, about thirty-miles south-east of the western edge of this granitic field, there rises a mass of red granite in the surrounding slate rocks, which carries the most important lodes of tin ore which have yet been found in Queensland, and which will be spoken of hereafter.

The rock of this tin-bearing district is, as has been said, granitic. Its quality is not at all uniform, occurring in patches, as red, gray, white, and blue granite, and both fine and coarse grained, the latter variety being easily affected by dis-

integrating influences. Trap, and fine-grained granitic dykes are rarely met with. Porphyritic dykes are, however, more common, and have, in general an east-north-east strike.

But four deposits of the tin ore have been found *in situ*. One of these, which has already been mentioned, is in the isolated patch of granite in slate rock, at what is called Red Rock; another is at Killmister, near the point where the Severn River flows from the granitic to the slate rocks; the third is at Mt. Marley, which is a few miles north-east of Stanthorpe; while the fourth lies directly east of Stanthorpe, and on the western side of the mountain range which divides Queensland from New South Wales. These veins, like the dykes, have an east-north-east strike.

With one exception, the tin oxide occurs in thin strings, or streaks, imbedded in quartzose veins, which average about two feet in thickness. These strings of ore vary from two to three inches in thickness in the larger quartz veins, and are associated with quartz, wolfram, and molybdenite. Sometimes the matrix changes from quartz to a decomposed fine-grained micaceous granite. The country rock is always granite, and is not generally found separated enough from the quartz to form walls, properly speaking, to the vein. The pitch of the veins is nearly vertical. At Killmister, Lode Creek, and Mt. Maclay, shafts have been sunk on the veins found, to a depth of about sixty feet in each case, but without finding the veins of ore and quartz to increase in width. The Red Rock granitic deposit contains the most important veins of tin ore of all those in Queensland. In it have been detected a large number of tin ore-bearing quartz veins, from one to eighteen inches thick, and having a north-east strike. One of these veins differs from all others which have been discovered, in having the tin ore imbedded in coarse-grained granite, instead of quartz. These deposits at Red Rock have not been worked to any extent, both from the fact that they are not very rich, and, also, because the situation is a comparatively inaccessible one. It will readily be seen, from what has been stated, that the veins of tin ore now known in Queensland, are of no great practical value. Placer mining, however, which has been carried on since June, 1872, has developed a large and very productive tin mining district. The beds of nearly all the streams running into the Severn River, have been found to contain varying amounts of tin stone mixed with gravel, from which it is separated by washing. As yet, nearly all the ore raised has been obtained from the gravel beds of existing streams, the workings having been carried to an average depth of ten feet, and in some cases to a depth of twenty-five feet

Recent workings have demonstrated that the ore deposits are not confined to the beds of the present streams. Workings in one case have been carried to a distance of 2,000 feet from the present stream bed, paying ore being found in the drift overlying the granite.

These deposits of stream tin have, in all probability, resulted from the decomposition of rocks which contained the ore, in strings or veins, which rocks were at higher levels than that in which the ore is at present found. Heavy rains, and, possibly, snows, have served to concentrate these ore fragments in the stream-beds where they are now found.

Much of these drift deposits are in the form of unproductive strippings, the ore containing gravel varying in depth from one inch to five or six feet, averaging a foot and a half. Sometimes several nearly pure layers of the ore are found separated by unproductive gravel, indicating that they have been formed by the action of heavy storms at different periods. The ore-bearing dirt, like in the occurrence of alluvial gold, varies, some patches being almost barren while others are quite rich. The richest wash dirt yet found contained 90 lb. of pure ore per cubic foot, while good average wash-dirt yields from 2 to 10 lb. per cubic foot.

Some small areas which have yielded exceptionally large quantities of ore, are a seven acre lot on Quart Pot Creek near Stanthorpe, which contained 120 tons of washed ore; 66 feet square on Ruby Tin Mining Company land on Sugar Loaf Creek, which yielded 10 tons of ore; and a bar of boulders, containing three square chains, on Quart Pot Creek, which yielded 40 tons of ore. The cost of raising the ore varies from ten to forty-five pounds sterling per ton, the average being about thirty-three pounds. The cost of transportation from the mines to Brisbane, where the ore is either shipped or smelted, is about £3 12s. per ton.

The amount raised and the price per ton in Stanthorpe, (at a later date), was as follows:

From June to Dec., 1872.....	1,400 tons.		£65
" Jan. to June, 1873.....	2,114	"	65
" July to Dec., 1873.	3,160	"	46 10/
" Jan. to March 31, 1874.....	1,360	"	42
Making a total of.....	8,034 tons.		

The tin ores from Queensland, which are shown at the Exhibition, are all taken from the placer mines, a section is shown illustrating the nature of the deposits which are found outside the beds of existing streams. The material overlying the ore dirt looks like a fine light yellow loam, which has resulted from the decomposed rocks which at one time contained the ore in position. The ore bearing strata is slightly darker and coarser. The washed ore, which consists of pebbles of the nearly pure cassiterite, is of varying size, the grains from some mines being as large as filberts, while those from others are in the form of fine sand. One thing which marks nearly all the specimens exhibited, is the very uniform size in which these grains are found in the different deposits. Some of the grains are very slightly worn from their original crystalline forms, but in the majority of cases they have been well rounded by the action of water.

The Queensland Smelting and Assaying Works of Brisbane, have sent a large pile of ingot tin, which has been smelted from quite a number of ores from different mines. There are fifty-six ingots in all, each weighing 80 lb. The ingots bear the following brands: "Merry," "Victor," "Q. T. S. & A. W.," "London," "S. T. M. Co.," "A. J. P." "J. & G. HARRIS," "Bulimba," "O. D. A." "Kelly Swamp & Mt. Marlay Mining Company B," "C. R. & Co.," "H. C. R.," "***," "Blue Mountain Tin Mining Company," "C. H. & Co.," "A. B. S. W."

NEW SOUTH WALES DISTRICTS.

The most extensive tin mining operations yet carried on in Australia are those of the New South Wales districts. In 1853 the Rev. W. B. CLARKE, a geologist, made an examination of the territory in which tin is at present extensively mined, and reported that there were good indications of the presence of tin ores in considerable quantities. But little practical result followed from this report for many years, and only since 1869 or 1870 has the ore been sought for by miners. The principal districts lay in the north-eastern part of New South Wales, some of them adjoining the Queensland district, which has just been described. A number of smaller districts are found in the south-eastern portion of the colony, near by or bordering on the Murray River. The most important of the northern districts is that which has the town of Inverell for a center.

The elevation of this district is from 2,000 to 2,800 feet above sea level, the country being very hilly and broken by many water courses, some of which have worn deep ravines. The geological formations of the country are, in general, made up of eruptive rocks, which in places have thrown up some of the carboniferous formations. The eruptive rocks are of two general kinds, granites and traps. The granites, which are often found inclosed as dykes in greenstone traps of anterior formation contain the tin ores, and, probably, the denudation of other portions of the same formations have furnished the stream tins now found in the alluvial deposits. Besides the older trap in which the granites are found embedded there are some of much later origin, which have covered sedimentary deposits containing stream tin. The stream tin is found in one recent and three tertiary formations. In the recent formation, which has resulted from the cutting through and transportation of the older drift deposits by existing streams, the first tin ore was naturally discovered and worked. Ple stocene drift deposits, generally found in the valleys of the district, and which have, at one time, been the beds of large streams, are the next formations, geologically, in which the ore is found and worked. Underlying this drift, and separated from it by basaltic trap, is a Pliocene drift also containing tin ore. These basaltic eruptions have taken place in many parts of the district, and in some places they form the beds of existing streams. These comparatively recent traps must have broken through the older greenstone and granite formations in which the tin lodes occur. Below all these formations there seems to have been extensive Miocene deposits which, at one time, covered the whole district, but which have since been much eroded in places. The upper parts of this formation consist of a sandy concretionary ironstone, which is underlaid by sandy clays, beneath which are found water-worn drifts and conglomerates, containing in many places rich deposits of tin stone.

The rocks containing the tin lodes or veins, as has already been stated, are granitic. The ore is sometimes found in strings in euritic granite dykes, and often associated with strings of quartz It is also found in veins in feldspathic dykes. One of the most important deposits yet found, is that of a dyke made up of a highly micaceous granite, in which the ore is disseminated in pieces ranging in size from small pin-head crystals, to lumps weighing 50 lb. Unlike the deposits already discovered in Queensland, quite a number of these tin lodes are of such value that their working is highly profitable.

In the New South Wales exhibit in the Main Building, there are a considerable number of large specimens of lode tin from the Boletho Mine on Copes Creek, which runs through the district lying to the south and west of Inverell. These specimens were found in irregular veins traversing an euritic dyke whose dip is nearly vertical. The masses of the ore which are exhibited show it to consist of nearly pure crystals of cassiterite, with adhering gangue of decomposed feldspathic granite. In places where the smaller veins unite, masses of this pure ore, weighing as much as 1,000 lb., have been taken out. Quite a number of specimens from other mines, which are exhibited, show the cassiterite in crystalline masses attached to quartz, while one very interesting specimen from the Albion Tin Mine on Copes Creek consists of quartz crystals which are covered on the outside, and also hold inclosed in their mass crystals of cassiterite. The conclusion would naturally be formed that the quartz and cassiterite had been deposited simultaneously from solutions.

The most valuable of all the lode mines yet discovered, is that in which the ore is found disseminated through micaceous granite dykes, and which have already been spoken of. This is the Elsmore Mine, which is situated on the Macintyre River, about twelve miles east of Inverell. The country rock is a micaceous granite containing orthoclase. This granite is traversed by a number of small quartz veins which, in places, are highly micaceous, and through which cassiterite is found in small seams and single crystals. These veins are, however, unimportant, when compared with the larger micaceous granite dykes which are several feet in thickness. Six of these dykes have been discovered. This rock, when crushed, yields about one per cent. of tin ore.

TO BE CONTINUED.

ABSTRACTS OF LECTURES ON MINING.—No. V.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

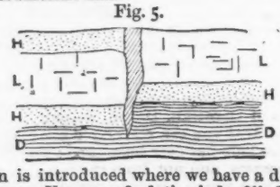
IN the last lecture I pointed out some of the conditions under which metallic minerals are concentrated in particular parts of the lodes, and showed how irregular these were. It has been for many years past the object of the miners to endeavor to make out some rule by which to be guided; to see whether, and if so, in what manner, they are affected by the dip or cleavage, etc., of the rocks they intersect. In some cases it is quite clear that these produce no effect on the vein, but in others we meet with a curious parallelism, which is of a different kind; and this more particularly when we look at the passage of lodes through those rocks which are so distinctly stratified, that we may compare the condition of a lode in one set of beds from its condition in another and different set. In massive unstratified, and also in crystalline rocks, the matter is more difficult, and it is only here and there that we gain a sort of clue to them. I mentioned that the miners, as a general rule, believe that there is much more probability of finding the vein run continuous in depth than to any considerable distance in a horizontal direction; and in general, if you have a shoot of ore at one level, you may expect to find it continued at a lower level, more or less vertically below. It is an interesting question as to how far the veins may be expected to hold good in depth; and what is the chance of the vein, or the orey part of it, being continued downwards. There are now a number, of mines carried to a depth of 300 fms., and some few considerably deeper; and as a general conclusion from the observations thus accumulated, especially in the districts of Cornwall, Devon, Saxony, and the Harz, we may say of metalliferous veins that you can scarcely point to a single instance in which the bottom of a true lode has ever been seen; the workings have ceased from a number of other causes, and not from the fact that the end of the lode is reached. The deepest hole which has been bored into the crust of the earth is a coal mine at Gilly, near Charleroi, which has been sunk to a depth of 3,411 feet; the deepest mine open at present is at Prizibram, in Bohemia, which reached the depth of 1,000 meters (over 500 fms.) in September, on which occasion a grand festival was held. The Samson Mine, on the south side of the Harz, is 420 fms.; the Tresaven Mine, in Cornwall, is 350 fms.; two other mines in the same county—Fowey Consols and Dolcoath—have attained about the same depth, the Dolcoath Mine being the only one of the three at present working.

The first noticeable thing in the following down of these veins is that they vary considerably in size and productiveness. Consequently, when the work-

ing of the mine depends on individual enterprise, or on a company, very frequently in coming to one of these unproductive parts, the mine has been abandoned for a time; only, however, in many cases, if it has made a good name while it has been open, to be re-opened after a time, when perhaps labor is cheaper, or machinery improved, by another person or company. Such, for example, was the case with the Samson Mine, which was closed about four years ago at an unproductive part, but very soon afterwards the discovery of another very rich deposit of argentiferous ores at some little distance below the limits of the former workings, led to the workings being renewed. In old books veins were classed "true veins," and "gash veins," the latter being those which came to a wedge-shaped point below, which point was regarded as the termination of the lode, and under this idea many workings were abandoned at such points. I think that unless we meet with a change in the character of the rock which forms the sides of the vein, it would be extremely difficult to point to any true instance of the vein being thus suddenly cut off. Of course, if the old idea was correct, it would be injudicious to erect any considerable plant, or base any hopes on a long-continued working. There is a case of a vein on the flanks of the Mendip Hills, which seemed to confirm that idea. It was opened 200 years ago for calamine and iron ore, and was said to come thus suddenly to an end; and I think there is in this case very fair evidence that it is so. On examining the nature of the district you find a surface of magnesian conglomerate, known as a material which not unfrequently yields iron ores. This rests upon a bed of carboniferous limestone, the conglomerate here being about 30 feet or 40 feet thick; the vein is continued through the conglomerate, but wedges off, and does not pass into the limestone; except, perhaps, in the form of small strings. So that in this case the terminus (or change) of the vein is coincident with a change in the rock in which it lies. The Tresaven Mine, mentioned above, was opened as a copper vein—at a time when it was not believed that copper existed in the granite—and yielded large quantities of ore, then from the lower levels not being so good as the upper ones, or from the vein being pinched, the mine was abandoned, although there was no appearance of the vein having been worked out. Of the Fowey Consols Mine, which I had an opportunity of seeing just before it was closed, the same may be said; and, in fact, if the depth was much smaller the vein would be regarded as a tolerably good one still. In these nips, squeezes, or hitches, therefore, the experienced miner will recognize a character which may last for a few inches, feet, or even fathoms, yet where the country around the lode is not considerably changed, may, nevertheless, be but temporary, and to be overcome by patient and persevering opening of the ground.

And now I will say something of the varying character of the ground, or country. In North Wales, for instance, many years ago, a very productive lode in greenstone, or diorite, was worked, but was abandoned, on the idea that this was a gash vein; subsequent renewal of the workings, some few years ago, proved that the vein did not really terminate there, but on coming down to a mass of slaty rock it was found running through the rock as a number of small strings. A similar character is very notorious of the veins of Derbyshire; these occur principally in the mountain limestone, and are comparatively regular; on following these veins down they come to a band of rock of more or less volcanic character—"toadstone" (so called from the German word *todt*, meaning dead), and this toadstone was said to cut off those veins entirely; but further researches have shown that the veins are carried forward through the toadstone, often obliquely, or, as miners say, they are "squinted" in one direction. If the working is carried through the toadstone to a second bed of limestone, the vein is found to open out again, and in some cases they have thus been traced to a third bed of limestone. Unfortunately, there is no regularity as to the thickness of the toadstone, and many cases have occurred of the abandonment of the workings after sinking some considerable distance into that rock without coming to its base. The same is the case in Yorkshire, and, to a certain extent, in Flintshire. In the great district of the North of England, from 120 to 130 miles long, you have phenomena very similar to those above described. The rocks in this district consist of alternations of beds of blue limestone, of yellowish grit or hazel, and of gray slatey beds, a kind of shaley clay. In passing through these rocks it would generally be found that the vein is richest in the limestone, in a less degree, but still moderately productive, in the gritstone, and then greatly impoverished in the shale, and very often this is accompanied by a slip, so that the vein is pinched together, and represented, perhaps, only by a few strings of calc-spar, with mere specks of ore. These veins will have to be carried downwards, and it will depend very much on where we take it as to whether we meet again with likely rocks. It is the well-understood business of the miner in these districts to make himself a thorough geologist, so far as the character and the thickness of these different beds are concerned. Hence you will find the sections carefully drawn and retained, and if the man can identify one of these beds (since each has its local name), in a brook course, for example, or on the side of a hill, he will be able to form an opinion as to what beds and what veins he is likely to come into contact with. One particular band of limestone has been very productive, and hence it is important that the miner should be able to recognize such band. The question whether underlying beds are productive, is not settled either in Derbyshire or Yorkshire, but it is a question on which the future prospects of those districts will depend. I might mention among these beds an extraordinary stratified mass, of great thickness, lying towards the bottom of the limestone, a basaltic mass called the great "whin sill," which the miners were generally afraid of encountering, on account of the impoverishment of the veins, or the difficulty with water, etc.; but two or three successful examples have shown that these fears are only prejudices, founded on insufficient data.

Fig. 5.



A great complication is introduced where we have a dislocation accompanying the vein, as in Fig. 5. You may find the lode filled with douk, which is troublesome to get through, and to get rid of the difficulty of water, so as to clear the ground. In the figure H represents the hazel, or grit; L the limestone; and D the douk, or plate, or shale. Where we have limestone on either side of the vein it will be very productive, but in the douk it thins out. The important question will be what is the amount of throw, and this can only be ascertained by an intimate knowledge of the rocks.

It has been hoped by some industrious persons that careful analysis of the "country" of the lodes would lead to practical conclusions, but up to the present I do not think any good results have flowed from this, partly from the following causes, that we shall find that the physical condition of the rocks has to be closely looked to, as well as their chemical composition. Thus, you may have two rocks, both of which a geologist would call granite, yet one would be hard and angular, and the other softer, and more or less decomposed; the miners pronounce the angular one to be very unfavorable, the one with an earthy character to be "kind" or favorable. And if we look at the evidence given I think there can be no question about it; there is a great deal in this argument of the importance of physical condition, not as applying to granite only, but also applying to many other classes of rocks. In Cornwall and Devon the miners are always very apprehensive when they approach a different kind of rock from that in which they have been successfully working; they fear that the vein may cease to yield, or yield in less proportion, and this is not without reason. As a rule, the tin ore is more especially found in the granite, and copper ore in the slate. If you look at this large map of Cornwall you will see that the whole of the mining districts are aggregated within a small belt of ground around these elevations of granite. The lodes will be found within a distance of from two to three miles from the edges of the granite, with the exception of a very few straggling mines which are but little productive; and these mines are nearly all of a totally different kind from the genuine copper and tin mines, producing iron, or lead, or zinc ores. As a general rule not many mines have been worked in the centre of the granite tracts, the chief aggregation is round the edges near the junction with the killas. The famous Comstock lode of North America has one wall of a dioritic rock, to which the name of propylite has been given, and the other wall is of a syenitic rock called andesite. The Mexican and Hungarian mines come near to this in point of character, and they consist frequently and in great proportion of dioritic rock, in which, instead of bright lustrous crystallized particles, you find an earthy character about them. This is quite analogous to the case of the granites above mentioned, where, instead of the bright vitreous luster of the feldspar, it has an earthy appearance. A pamphlet was purchased some time ago by Captain C. THOMAS, of Delcoath Mine, in which he insisted most particularly on the attention which ought to be given to these facts, especially in connection with ores of tin.

Turning to the clay-slate rocks, the same holds to a great extent. If you have a strong, durable rock, very readily fissile, you are not likely in that to meet with anything ore-bearing, and as you approximate to that so do you lose the probability of finding good ore. On the other hand, if you take a series of specimens of killas from different productive districts, you will find in general that they exhibit pale buff and gray tints, and have a sort of earthy character, very frequently with a little crystalline structure about them, which appears as you approach the granite. Where you see these characters it is very often the case that you may find the speciality in the copper ores to be, if they occur at all, to yield red and black oxides and carbonates, whereas if you follow them into the darker killas the ore not unfrequently changes into the more common one—copper pyrites, or yellow copper ore. I will mention one other remarkable case in Norway, in the district of Kongsberg. The district there consists of hard metamorphic slates, while in a north and south direction run what are called "fahlbands"—a hard quartzose schist, with mica and hornblende. These bands have generally disseminated through then a quantity of sulphides, iron pyrites in the largest quantity, sometimes zinc-blende and others. The "fahlbands" can be observed in walking across the country by their ochreous appearance, due to the decomposition of iron pyrites. Veins run across the country in an east and west direction, and these veins, wherever they pass through the "fahlband," are argentiferous; and, although of a width of not more than 5 or 6 in., have been followed down to a depth of 226 fms.; but whenever they are followed into the harder schist of the country they produce nothing. These examples might be greatly extended if it were necessary, but I think I have mentioned sufficient to show you the general character of their teaching; and also we must bear in mind that the indications in different districts are not always conformable.

THE STOW FLEXIBLE SHAFT.

Special Correspondence of the Engineering and Mining Journal.

A VERY ingenious arrangement, which has been used for a number of years to perform various drilling and hammering operations in dental practice, consisting of an apparatus by which a circular treadle motion is conveyed through a small flexible rod, or stem, to the tool in the operator's hand, has lately been materially enlarged, and modified so as to perform a considerable number of mechanical operations in a much better and more expeditious manner than heretofore. The essential peculiarity of the machine consists in a flexible shaft which can readily be bent in any direction, and at quite sharp angles, without being weakened or hindered in its motion by so doing. A number of jointed shafts have been invented to arrive at the same ends, but for various reasons they have but indifferently succeeded.

The Stow shaft is made by building up a cable of successive layers of steel wire, each of which is closely coiled in a direction opposite to that given to those which adjoin it. The coiling is done with as little pitch as possible, four to five wires being wound simultaneously to form one layer. This construction of the cable makes it quite flexible, as the planes of the coils in every wire are nearly perpendicular to the axis of the shaft, so that when the cables are bent out of a right line a torsional strain is brought to bear on each coil of wire, so that they imperceptibly open along the outer radial surface of the cable. The principal torsional strain, however, which is that brought to bear on the cable by the frictional resistance of the working tool to the power which is being transmitted through it, acts upon the wires which make up the cable in the direction of their greatest strength, *i. e.*, that of their length. Each layer being tightly wound upon the one which it incloses, is thereby prevented from being twisted smaller by this torsional strain. This flexible shaft is inclosed in a case, or sheath, made of a single layer of steel wire, which is coiled in the same manner as has been described.

This coil of wire is again surrounded by a covering of leather or linen braid work. The purpose of this sheath is twofold: it protects the cable from injuring or being injured by things with which it might come in contact while in rapid motion, and also by its stiffness it prevents the cable from being turned through too acute an angle. Both ends of the cable have the wires which compose it brayed together for a short distance, in order that sockets may be fitted on them, to which are attached the driving spindle and the operating tools. It will be seen, from the accompanying drawing, that the frame which holds the driving pulley is attached to the shea h of the shaft, so that the spindle which passes through this pulley can, by means of a very simple contrivance, pass freely back and forth through a short distance. This

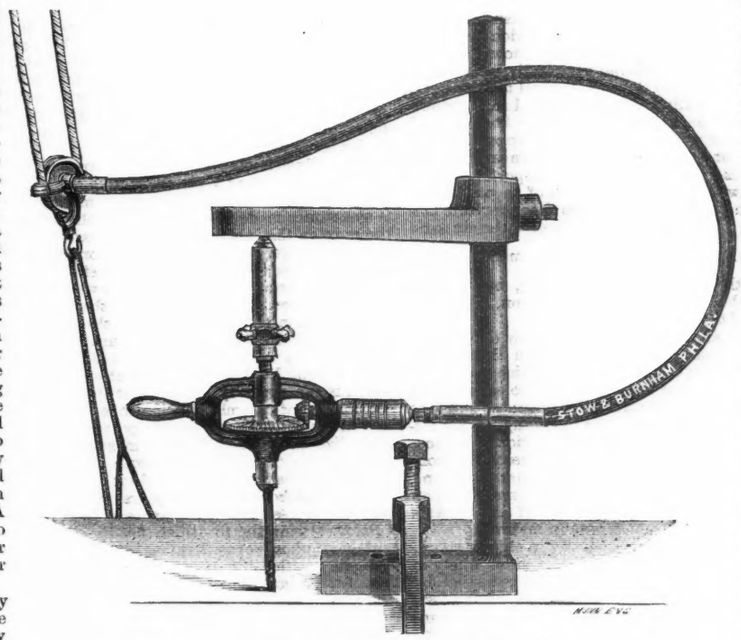
arrangement is necessary, in order to provide for the change in length which the flexible shaft submits to when curved in different degrees. The pulley frame has a hook attached to it, so that it can easily be fastened by a cord or small rope to any convenient object, thus admitting of the use of belts of varying length, which are run from an adjoining counter shaft. To the other end of the flexible shaft is attached a spindle, working in a socket attached to the sheath, and which latter is held in the hand of the operator. A clutch is made on the spindle, which is thrown in and out of gear by a small projecting pin on the hand piece. This clutch is very useful when it becomes necessary to stop the operation of the attached tool quickly, and when the operator is out of reach of the belt-shifter on the counter shaft. When thrown out of gear, the shaft continues to revolve, without harm, in its sheath. The shafts are made in sizes ranging from ¼ inch to 1¼ inch diameter, and from eight to ten feet in length. If necessary, these sizes may be increased, being practically limited, however, by the weight of shaft which can be conveniently handled. This flexible shaft arrangement has already been applied to quite a number of operations.

The machine shown in our illustration is applied to the drilling of holes in metal, in cases where the slow and costly operation of hand-ratcheting is generally resorted to. Where locomotives and other heavy work, which has to be set up before many holes can be drilled, these machines will prove very serviceable. The small breast drills, which in some shops are quite largely used, have been changed so as to be driven by the flexible shafting.

For wood-boring an ordinary bit is attached to the ends of the flexible shaft, its direction being guided by hand. Those who have had any experience in the repair of locomotive or other tubular boilers, know what a difficult operation it generally is to cut out defective tubes. Mr. STOW has invented recently a very simple piece of mechanism, which by means of the flexible shaft, is able to cut out a tube in a couple of minutes after the apparatus is fixed in position.

This attachment consists of a cylindrical tool, having at one end a loose collar, which snugly fits the interior of the tube to be cut out. A short distance back of this collar, there projects from the cylinder a small cutting tool, which is forced outward by a feather working in a slot made in the base of the cutter, the feather making an angle with the axis of the cylinder. The feather is moved backward or forward, so as to throw the cutter in or out, by means of an attached rod and thumbscrew, which projects from the back end of the cylinder. A small pinion, which is attached to the flexible shaft, drives a spur wheel which is keyed to the cutter bar or cylinder.

Stone dressing, which is so costly in this country on account of the work being done almost entirely by hand, has been in some operations considerably cheapened by the application of the flexible shaft. A broad circular disk of cast iron, driven by a bevel gearing similar to that shown in the drawing, has been used for some time in the marble works of STRUTHERS & SONS of Philadelphia, for polishing marble. A small amount of sand and water serve as polishing material, the disk producing the necessary friction. Emery wheels applied in the same manner, are found to polish granite much better than is done by the hand process.



STOW'S FLEXIBLE SHAFT.

For making fluted columns, the flutings are first roughed out and then finished up by a cast iron cylinder, with hemi-spherical ends, which is driven by a flexible shaft. Sand and water are used in connection with this revolving cylinder.

A number of other attachments, among which is one for cleaning castings, and another for emery grinding, have been applied so as to be driven by flexible shafting. Those who desire to see these machines, can find them all in operation at the exhibit of STOW & BURNHAM, Machinery Hall (D, Section 9, Column 68).

A BELGIAN COLLIERY.

AMONG the entertainments which celebrated the opening of the Brussels Exhibition, in July, was a visit to the collieries of M. WAROCQUÉ. M. WAROCQUÉ is the principal proprietor of the collieries of Mariemont, which supply Brussels with coal for domestic purposes, and he is also the largest shareholder in the company which works the neighboring mines of Bascoup. The production of coal in these pits was largely extended by the father of the present proprietor, who died about ten years ago. The mines are famous for the attention paid to the comfort of the workpeople, and it was the inspection of the arrangements made for this object which brought the visit, on the 30th of June, to the collieries, by the Foreign Committees within the scope of the Exhibition. The 1,476 hectares of the Mariemont Colliery, and the 2,680 hectares of the Bascoup Colliery form part of the central basin of the Hainault coalfield, enriched by the coal measures which extend from the sea to the Ruhr, and are said to reappear in Wales. There are nine pits. Lines of railway with endless chains converge from the five pits of Mariemont upon one screening shed. Near every pit the landscape is dotted with little villages for workpeople. There are no black clouds of smoke, but the fields are green, and the sky is visible in its natural colors. The houses of the company are built in little rows of four to six cottages in each. Every block of houses has a building to be used as an oven for baking bread. Every house has a cellar, a large sitting-room or kitchen downstairs, a kitchen proper for cooking, a room for the parents, and, above, two rooms, one for the boys and one for the girls of the family. Above this floor is a loft. Every houses has a garden with a little tool-house and pigsty, for nearly every villager keeps a pig and has *la pou'e au pot*. The society makes yearly additions to the number of these houses, and there is a great demand for them. They cost about £80 to build, and the cottagers pay 6½f. a month for rent and gas. Advances are made without interest to enable the workmen to buy the houses in which they dwell. About 5,000f. is always being employed in this way. The total number of the model houses at present built is about 500. The total number of workers in and about the mines is nearly 5,000. Some of these are children engaged in drawing and cleaning. Some of them are stalwart girls, who handle the cars at bank with great readiness, holding a pansy or some such flower in their mouths to make the work light, as boatmen row chewing lemon-peel. All the workpeople are connected with the Provident Society of Coal-Workers of the Center. The companies have promoted the formation of co-operative societies for buying provisions, and of societies for mutual aid in case of accident or illness. There are six sections of the co-operative society, and eight of that of mutual aid, divided according to communes, but not exclusively confined to workmen of the two companies. Only one strike has ever been known at Mariemont. The companies have made considerable subventions to the communal schools, the adult schools, and the libraries of the people. M. ARTHUR WAROCQUÉ, the present managing owner, has recently presented a technical school to the commune of Morlanwelz, the center of the collieries, where 150 pupils receive instruction in arithmetic, geometry, drawing, chemistry, geology, and physics generally. The teachers in this school are the engineers of the mines. Pensions on the same principle as the Belgian Government have been established by the companies. A house of retreat for aged workers in the collieries was among the buildings rapidly passed by the carriages provided for the visitors to Mariemont. A longer stay was made in the school of Morlanwelz. The extensive garden of the workmen's city (*cité ouvrière*), where a band plays on *fête* days, and attracts the country people for miles round to hear the music, was also rapidly passed. This band welcomed the King of the Belgians with the National Air the other day when he came to open the exhibition. Of course, all these arrangements considerably add to the expense of working the collieries, but the societies think they find their account in the increased intelligence and steadiness of the work-people, and their unwillingness to quit their present employment.

The cost of raising every ton of coal in labor and interest on capital is reckoned at 15f. The seams are very thin—from 40 centimeters to 1 meter 60 centimeters, and lie at a depth of from 210 to 510 meters. No coal-cutting machines are used. The mines are propped throughout with Belgian timber props, great stacks of which are to be seen in the neighborhood of the collieries. Access to the pits is gained for the workmen by the Warocquére or man engine, in which the workmen step from cage to cage, each cage sinking a few feet to the level of the next, till the bottom of the pit is reached. Though progression is slow for one workman, a great number can thus descend the deep Belgian pits at one time. The first machine used in Belgium for the conveyance of workmen exclusively, and not for workmen and minerals too, was employed at Mariemont in 1845, having been designed by the late proprietor as an improvement upon the German *fahrkunst*. M. LUCIEN GUINOTTE, director of the Mariemont and Bascoup Collieries, has further improved the apparatus. The hewers or cutters of coal who go down in these machines earn an average of five or six francs a day, gains being reduced to this point since the present commercial depression which affects Belgium as well as England. The drawers earn wages proportionate to their age and ability. The girls at bank make two francs to two and a-half francs a day. The hewers are paid by piece-work, the others are day laborers. The total production of the collieries is about 800,000 tons per annum. The population of Morlanwelz is 8,000, and has doubled in the last ten years. Among the institutions not yet mentioned is a *crèche* on the FRÖBEL system, for the children whose mothers are away at work. The 200 visitors to Mariemont saw these buildings and gathered some of these details. They went and returned by special trains, and found waiting for them at the station carriages which had set out on the journey from Brussels to Mariemont on the day before. They visited first St. Arthur's pit, saw the coal hauled to top and the little trucks caught by women and hooked to the endless chains which, used both for above-ground and under-ground traction, here traverse hill, dale, and tunnel for three miles till they reach the general screening shed. No such extensive use of the system has been made anywhere else, not even in the Burnley district in Lancashire, whence it has been adopted. The pumps employed here are not Cornish engines, but are very economical in the consumption of coal, and present noteworthy details of construction. At the screening shed the trucks are wheeled by women towards sieves, which are to divide them into their three qualities of *gros*, *gailletterie*, and *menu*. The stones and pieces of wood are picked out by children as the coals revolve, before falling into the sieves, on great circular tables. The several qualities then fall through the bars of the proper sieves into ordinary railway coal-trucks, and are so conveyed o their destination.—London *Times*.

BALTIMORE AND OHIO RAILROAD.—The rolling mills of this Company, at Cumberland, have suspended operations temporarily, and 600 men are, in consequence thrown out of employment.

THE EFFECT OF MANGANESE IN BESSEMER METAL.*

By August Wendel, Troy, N. Y.

IT is a well known fact to all Bessemer steel manufacturers using a blooming mill, that ingots show large cracks in the first few passes of the rolls, which, in the following ones, do not always roll up satisfactorily.

This deficiency in the quality of the product is generally called "redshortness," though, in the writer's opinion, mostly unjustly so. Different explanations for the said peculiarity are given by the leading authorities, every work selecting one element as a special scapegoat for the inferior quality of the ingot. The sulphur is generally first charged as being the principal cause of all mischief in this direction; then, after ascertaining that sulphur is not higher than the average, and sometimes lower in the very worst heats, silicon has to bear its share of abuse. How, and why silicon should effect the working qualities of the metal, the writer could never precisely learn, but is convinced that the doctrine of its pernicious influence is an established one with many.

In cases where silicon failed to explain everything, resort was taken to calcium, aluminum, and some other known or unknown elements, without settling the difficulty; and lastly, when the skill of the chemist became exhausted, "practical men" came to the same conclusion, which many leading blast furnace managers had arrived at before, that analytical chemistry was good for nothing, but to disagreeably hamper the flight of their imagination. The trouble did not rest, however, entirely with the chemist, but with those who rather too hastily jumped at conclusions derived from his results.

Before making a few remarks on this subject, I would like to state that I do not propose to discuss anything about redshortness, legitimately so termed, but about the conditions necessary to allow the Bessemer ingots to stand the strain of the two first grooves in the blooming mill, the absence of which quality the writer may term "want of body," no other appellation being known to him.

Every steel manufacturer knows that steel, rolling very badly in blooming, may be hammered to perfection, and, therefore, the mechanical test cannot be consistently taken as a criterion for its rolling qualities. Real redshortness, however, will show sooner or later in the material, no matter how worked. The conditions favorable to prevent this "want of body," are apparently due to the right proportion of carbon, silicon, and phosphorus to manganese, other conditions being equal; and the necessity of keeping this proportion within the proper limits, seems to increase with the increased size of ingots. From many analyses made, both of good and bad steel, I came to the invariable conclusion, that with steel having little phosphorus, in order to give certain satisfaction, the co-efficient $\frac{\text{Mn.}}{\text{C.} + \frac{1}{2}\,\text{Si.}}$ was larger than 0·8; and, with such as worked doubtfully or badly, it was smaller than this fraction, meaning, by the symbols, the respective percentages of the elements, carbon, silicon, and manganese, as estimated by the analyses of the steel.

This assumption may seem arbitrary, and the too small quantity of manganese in the product might be considered only indicative, that in the reaction there was not a sufficient surplus of manganese present to furnish a momemtum for the more complete deoxidation of the Bessemer blow-holes; but, on the contrary, the writer claims that a certain surplus of manganese must be present as a constitutional element of metal intended for blooming. This latter assertion may easily be reconciled with the many observations of those who feared the bad influence of silicon in the quality. Those heats that contained silicon to a considerable degree, were generally blown rather short, and consequently contained not only silicon, but proportionately more carbon than they should have according to this co-efficient, especially if at the same time the spiegel had lost an unusual amount of manganese in melting.

Hot heats, that are liable to be blown too short, come mostly in this category, and this led to the opinion that the highly silicious irons were more likely to produce this want of body—a deficiency which may be easily remedied by blowing sufficiently, that is, removing both silicon and carbon as much as possible, before recarburization. This explains why steel from hot heats almost invariably rolls badly when blown too short, but I have seen a most excellent quality of steel from heats excessively hot.

A theory about the beneficial influence of the manganese in preventing the "want of body" may not be necessary, as the remarks in this paper are entirely empirical. But, I am inclined to assume that manganese combines with carbon and silicon in certain proportions in lieu of iron, thereby changing the constitution of the metal, although such a statement may seem very heterodox in view of the preponderant quantity of iron present.

The second and more important part of these considerations, is the influence of phosphorus on the want of body. It is a well known fact, that phosphorus does not increase the red shortness of steel or wrought iron, and that, on the contrary, many metallurgists claim that the bad effects of sulphur are counteracted or modified by the presence of phosphorus. But the writer is clearly convinced, that this dictum cannot be applied to Bessemer metal rolled in a blooming mill.

Some time ago, Bessemer steel came under the writer's observation, of which the analyses showed the following composition:

Carbon	0·28	0·29	0·30
Manganese	0·907	0·837	0·925
Phosporus	0·524	0·498	0·513
Sulphur	0·088	0·086	0·084

I only give the analyses of three heats, as sufficient to represent the composition of others, whose working qualities were the same. This metal showed less sulphur than the average then manufactured; the quantity of manganese was more than sufficient to neutralize both carbon and silicon, and still the ingots crumbled up under the rolls, and most of them had to be taken from the tables in many pieces after a few passes. Both low and high heats were tried, but either way it was impossible to roll the ingots without disintegrating them. This steel showed only a very slight reaction, if any, in the vessel on recarburization; and looked, when poured into the molds, exactly like unrecarburized, or rather, un-manganized metal. The only explanation for this strange behavior, might be that the spiegel used on this occasion, contained little or no manganese. That this was not the case both the analyses of the spiegel, containing about eleven per cent., and of the steel, subsequently showed.

The percentage of phosphorus in this instance was excessive, but afterwards I was fortunate enough to observe a similar bad run of steel with phosphorus as low as 0·20 per cent. Now phosphorus by itself does not impart such peculiarities to iron as those described above, and the only way to escape from this dilemma was to take for granted a large affinity of phosphorus and manganese at the temperature of the molten metal, both combining to some kind of phosphide of manganese in the act of recarburization; so that manganese instead of combining with the oxygens of the bath, combines with the phosphorus present, partly or entirely, and so becomes rather paralyzed in its proper sphere. The fact of the manganese percentage being unusually high rather strengthens this opinion, inasmuch as the manganese, by simply combining with phosphorus, will not show any decrease of quantity otherwise produced by the oxidation of this metal. An explanation like the one given may be contrary to the traditional notions concerning the affinity of elements, but it must be doubted whether the affinities have been much studied in temperatures and under conditions such as those we are concerned in at present. Is it not just as unlikely that gas bubbles should be retained in a molten metal where such a high temperature ought to give them a somewhat considerable expansion? And still they stick to the great discomfiture of Bessemer men. It seems to be much less of an improbability that manganese should combine with phosphorus in preference to oxygen, which fact, if it be one, may become just as disagreeable to the manufacturer.

I purposely refrain from giving any formulæ of polycarburets and polyphosphides, which, hypothetical as they always must be, would have to be made probable by synthetic experiments outside of the compass of this paper. Smaller quantities of phosphorus of course could not paralyze the deoxidizing influence of manganese, but will do so to a certain degree as observed by me.

In order to overcome the bad influence of phosphorus in the rolling of Bessemer ingots, I would suggest that the percentage of manganese in the steel should be four times as large as that of phosphorus, in addition to the manganese quantity required for the neutralization of carbon and silicon, according to the co-efficient given above. The proportions given by me may need modification, but they certainly do not yield a larger percentage of manganese than required, if the manufacturer desires to be safe. This would not exclude the possibility that sometimes steel with smaller percentages of manganese may roll tolerably well. I need hardly say that steel made from manganiferous irons by blowing short and without recarburization does not come under these considerations.

As an illustration of my theory I must add a few remarks about the irregular working of different heats made from the same irons and blown with the same care. It must have puzzled every manufacturer to find that a very bad blow is sometimes made between two excellent ones. This led the writer first to the opinion that not the absolute quantities of one or more elements in the iron, but rather some relative proportions of elements, changeable in conversion, influence the working of the metal.

There are two kinds of bad heats which prominently present themselves in this connection. In the first place the bad rolling heat does not show any abnormal carbon percentage, it being the average, and still the ingots break badly at the rolls. In that case the manganese percentage is low, which is easily accounted for by an excessive loss of manganese in melting the spiegel.

The second kind shows a percentage of carbon much lower than the average, which is explained by the fact that the heat in question did not get the requisite amount of spiegel by carelessness or otherwise. Now as the carbon in this case varies with the manganese percentage, the latter must be high enough to neutralize the carbon, but in most cases it is not high enough to counteract phosphorus. The steel, with some mixtures, will roll to perfection with low carbons. What mixtures will do it? Those low in phosphorus.

The moral from this is easily drawn. If you cannot reduce your phosphorus, take care to keep your manganese as high as possible.

Before attempting to utilize, for Bessemer works, irons with a higher percentage of phosphorus than has hitherto been allowed, it would be well to investigate whether the quantity of manganese necessary to insure the good rolling of the ingot does not impart too much brittleness to the product when cold; and, according to results obtained, the manganese must be kept to the required limits.

The statement of the Terre-Noire authorities, that one part of phosphorus imparts to the metal a hardness equal to two parts of carbon, seems to be rather preposterous. According to this statement, some iron rails would compare very favorably with those of steel in wear, and still they show more wear, excluding lamination.

Phosphorus cannot be substituted for carbon, but the manganese combines with phosphorus and renders the metal hard and stiff, just as carbon would do. This is the reason why phosphorus steel with little carbon is hard, but it would be simply cold short with an insufficient quantity of manganese. In the first place the metal is a phosphor-manganese steel; in the second, a carbon-manganese steel, with phosphorus. Open hearth manufacturers have better opportunities to obtain a varying quantity of elements in their product than Bessemer people, who are somewhat hampered by being forced to introduce too large quantities of manganese, in order to give body to their ingot for reasons sufficiently explained; and therefore, from them we have to expect important developments in iron metallurgy.

In order not to get confused on the terms hardness, brittleness, coldshortness, etc., which are used promiscuously by many theorists, according to their several predilections, I will now conclude this paper, and leave it to the United States Test Commission to investigate how the varying relative proportion of elements influence the strength of the material.

* A Paper read before the American Institute of Mining Engineers at the Washington Meeting, February, 1876.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal.

ADMISSIONS FOR THE WEEK ENDING JULY , 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported		1,505,790	656,184	2,161,974
July 19	61st Day	18.729	10,019	28,748
" 20	62d "	16,681	9,255	25,936
" 21	63d "	17,714	9,678	27,392
" 22	64th "	16,941	9,795	26,736
" 24	65th "	20,754	10,562	31,316
" 25	66th "	21,914	9,595	31,509
Totals		1,618,523	715,088	2,333,611

LIST OF NUGGETS OF GOLD FOUND IN VICTORIA, AUSTRALIA.*

EXHIBITED AT THE INTERNATIONAL EXHIBITION, PHILADELPHIA.

NAME.	Where found.	Year.	Feet below surface.	Weight.	Value in Dollars.
			Feet.	Oz.	
Alma	Maryborough.	April 14, 1873	120	15	300
Beauty	Bendigo	1858	9	242	4,840
Viscount Canterbury	Berlin	May 31, 1870	15	1,105	21,100
Viscountess Canterbury	Berlin	October 3, 1870	66	884	17,680
Crescent	Berlin	April 2, 1872	2	176	3,520
El Dorado	Smythesdale	Aug. 26, 1873	155	170	3,400
Kumtow	Berlin	April 17, 1871	12	718	14,360
Lothair	Clunes	July 11, 1875	307	77	1,540
Needful	Berlin	May 10, 1871	12	240	4,920
Oldham	Turton'sCreek	April, 1873	2	236	4,720
Platypus	Bendigo	March, 1861	...	377	7,540
Schlemm	Dunolly	July 11, 1872	3	538	10.760
Spondulex	Jordans	Nov., 1872	8	130	2,600
Welcome	Ballarat	June 11, 1858	180	2,195	43,900

* Communicated to the American Institute of Mining Engineers, by Sir REDMOND BARRY.

MINING NOTES FROM COLORADO, MISSOURI, MONTANA, NEVADA, AND NORTH CAROLINA.

COLORADO.—*Rosita Index.—The Pocahontas Silver Mine* (owing to the low rates prevailing for silver and the large expense of freighting ore) has discharged all but twenty or thirty of its hands, and will suspend mining operations until they can erect reduction works so as to be enabled to utilize the low grade ores, the mining of which under the present condition of things is unprofitable.

The *La Plata Miner* says: We learn that GREENE & Co.'s smelting works are in full blast, and turning out about 4 tons base bullion daily. Below we give the prices paid by this company for ores averaging forty per cent. galena, based on silver at $1.10 per ounce.

70 oz. ore	12 cts. per oz.	200 oz. ore	72 cts. per oz.
75 " "	25 " " "	250 " "	77 " " "
80 " "	32 " " "	300 " "	83 " " "
90 " "	38 " " "	350 " "	86 " " "
100 " "	45 " " "	400 " "	89 " " "
125 " "	51 " " "	450 " "	91 " " "
150 " "	60 " " "	500 " "	93 " " "
175 " "	67 " " "	600 " "	95 " " "

Lake City Silver World.—The Ute and Ule Mines are being steadily worked on a contract, and they are producing three tons of ore to the foot of depth gained. The cost of sinking per foot is $20, and the ore sells for $30 per ton on the dump, making a nice profit of fully $40 per day to the owners. The owners have refused $100,000 for the property, and it is believed by experts that a few months of steady work will quadruple the present value of the mines.

Mining Review.—The Specie Payment Mine, at the head of Virginia Cañon, continues to improve with every foot of development. We had the pleasure of examining a $1,500 bar of gold which was taken from about 63 tons of the ore last month, and which is a visible evidence of the production of the property. Ore saving $23 per ton in stamps is of the very best class, being nearly three times as rich as the material on which the Bobtail, Briggs, and other large mines are working. The Sunshine Company, owning this property, have the best reasons for being satisfied with their purchase.

The report has reached us that there is great excitement at Empire over new gold discoveries. In a few days the population has doubled, and a score of new enterprises have been set on foot. The cause of the rush is said to be the finding of some remarkably rich gold ore not far from town.

Hall's Gulch.—It is likely that this season will see this district clear of many of the drawbacks that have hitherto delayed its growth. Of course almost everything depends on the operations of the English Company owning the mill, for a market for ore is necessary for growth. Heretofore, ores have had to bear a tax of $15 to $25 per ton for transportation, and, consequently, very little has been produced outside of the English Company's mines. We learn that the stack furnaces are being rapidly remodeled, and one is running quite successfully. When the other two are fired up, the works will have a capacity of from 60 to 80 tons daily.

The Millionaire Mining Company's Tunnel is now about 60 feet in length, and going ahead at the rate of a foot a day. It cuts five loads, respectively, 75, 130, 200, 600, and 1,800 feet from the mouth, of which the third is the Millionaire, and the last the extension of the Whale. The greatest depth attained under the crest of divide on a vein will be on the Trumbull, 600 feet from the mouth, which will be intersected 700 feet beneath its outcroppings. The English Company are doing considerable mining work, as if they really meant business this time. The great hope of the camp is of course in the South Park Road, which will come within four miles of the smelting works, and eight to nine of the mines.

MISSOURI.—*Granby Miner*, July 22—*Adkin's Shaft.*—The mineral in this mine is steel-grained sheet, ten inches thick in a soft clay opening. The prospect, as rich as it has been, is better now than ever. The mineral heretofore has been block but it is now sheet. The zinc prospect is also improving. The working lead now sweeps toward the north in the direction of the Tadpole shaft, while another lead seems to turn to the west, as if it would make the segment of a great circle. In fact the Tadpole falls within the limits of this are. The line shaft is the center of three big prospects worked by separate companies. The mineral team was just weighing Cisco's mineral that he had taken out at a single shift, amounting to about 4,000 lb.

MONTANA.—*Independent*, July 13.—Eighty-four tons of ore from the Acquisition Spur lode, at Butte, have been shipped east for reduction.....Copper ore from the Park mines is going forward to Salt Lake for smelting.....Three shafts have been sunk on the Trevonia lode—one of them is to a depth of 70 feet.....They are getting out a fine body of quartz from the Elephant lode, on Willow Creek.....The Whippoorwill lode in the Stemple district is turning out a splendid quality of ore. .....A number of new quartz discoveries are reported from the Silver City district. .....The placer mines on Crow Creek are paying better than usual this season..... The Blackfoot placers are still ahead of all rivals in producing gold.....In the Pinto lode, ore has been found five feet below the surface, which assays $211 to the ton .....Several placer claims have been purchased by Chinese in Emigrant Gulch..... The placer mines at Bannack are furnishing a fine supply of gold.....The shaft in the Northern Light Mine is down 115 feet, with a five feet crevice.....Several rich discoveries have recently been made in the Trapper district.....Twenty-two tons of second grade ore from the Late Acquisition Spur lode, sampled $400 to the ton..... The gold quartz in the Stemple District is said to be the finest in the Territory..... The Bannock placer mines are paying well.....The Centennial Reduction Mill is running on full time.

NEVADA.—*Elko Independent*, July 18—*Grand Prize Mine*, Tuscarora District.—A rich strike is reported in this mine, which is situated on the Virginia ground, an old location made in May, 1875 but we understand that no litigation is likely to grow out of that fact, owing to the existence of a spirit of compromise among the respective claimants. Some eighteen or twenty tons of rich ore from the new bonanza have been forwarded to the Leopard mill at Cornucopia for reduction, but the result of the workings has not yet been made public.

NORTH CAROLINA.—*King Mountain Gold Mine*, N. C.—As an evidence of what is possible in the economic mining and reduction of ores under favorable circumstances, we note the report that the above mine is said to have earned, within a period of six months, $17,000 profit on ore yielding but $5.50 gross to the ton. It would have been impossible to accomplish a corresponding result to this in any of our Western mines, owing to the greater cost of labor, fuel, and transportation.

The Richmond Iron Mines, near Stockbridge, Mass., have discharged most of their employés, and suspended mining operations for the present.

NOTES.

EXPLOSION OF COAL DUST IN A CALIFORNIA MINE.—An explosion in the Black Diamond Coal Mine at Mount Diablo, California, on the 24th inst., caused the death of six miners. Five others were seriously injured. The explosion was occasioned by a blast igniting the accumulated coal dust.

CONSEQUENCES OF THE DECLINE IN SILVER.—A mining firm at Eureka, Nevada, has become insolvent in consequence of the decline in the price of silver, and has signified its intention of suspending operations. Its employés in the mines refused to consent to a reduction of wages.

A POSSIBLE OUTLET FOR SILVER.—Several China papers state that there is a movement being made to introduce a mint at Peking. The Chinese have no fractional currency except inferior copper cash. China, it is said, would absorb fully £100,000,000 worth of silver, as fractional currency alone, in course of years.

CAPE BRETON MINERS ON STRIKE.—The time having arrived at which the men on strike at Sydney Mines should either go to work or surrender possession of the houses they occupied, on Wednesday last they all moved into camps, which they had prepared; and we are informed that on Tuesday night last a general breaking of glass and doors of the unoccupied houses took place.—*Advocate.*

AN EMERY DEPOSIT IN NEW YORK STATE.—JOHN H. ALLEN of Troy, N. Y., is the fortunate possessor of one hundred and twenty-five acres of land a short distance from Thurman station on the Adirondack Railroad, and about sixty miles from Troy, upon which is said to exist a mine of pure emery. Specimens of the deposit have been submitted to the Messrs. GURLEY and other eminent machinists, and have been pronounced the pure article. A geologist has examined the land, and, it is said, declares that a hill, where that which has been tested was found, is full of the precious stuff. The deposit is now being worked by a large force of miners. Several emery wheels have been made from the material already mined and have stood satisfactory tests.

RUSSIAN PRIZE ESSAY ON ENGINE AND BOILER MANAGEMENT.—The Russian Technical Society offers a prize for the best essay on the management of engines and boilers, drawn up in Russian, in a popular style, for the instruction of mechanics, stokers, engine-drivers, and others. The mathematical acquirements of its readers are to be supposed as not going beyond a knowledge of the first four rules of arithmetic. Manuscript and printed treatises are equally admissible. The prize will consist of a medal and a sum of a thousand roubles (£154.) Essays are to be sent in to the Society by Sept. 1, 1878, at the latest.

OESTBERG'S FIRE-PROOF DRESS.—MR. OESTBERG, a Swede, has been conducting some sensational experiments in various parts of the Continent with his fireproof suit. This is made in two layers, the inner one of india-rubber, the outer one of English leather; the head being protected by a helmet resembling that worn by divers. At the girdle is fixed a piece of hose, which serves both for air and water. The air-pipe, fed from two blowers, is placed inside the water-pipe, and brings the air, after being cooled by the surrounding water, into the inner part of the dress. The air inflates the costume, passing away through the two small openings made for eye pieces. The current of air not only keeps the inclosed body cool, but drives smoke and flame away from the eyes. At the back the water-pipe divides, one branch serving as an extinguisher, the other passing into the outer coating of the dress, the stream being distributed over the whole outer surface. With the apparatus on the experimenter stood in the middle of a pile of burning shavings and logs, without taking the least harm.

HUDSON RIVER TUNNEL.—Active preparations are now in progress for the construction of the Hudson River tunnel on the Jersey shore. The entrance to the tunnel is located on Jersey Avenue, near Fifteenth Street, and the excavation will be carried in a north-easterly direction, terminating in Washington Square, New York. The tunnel will be two miles in length, and it is calculated the cars will pass through it in three minutes. The road bed will be twenty-three feet in width. The shaft at the foot of Fifteenth Street, Jersey City, is 100 feet in circumference and the brick wall is three feet and four inches thick. The shaft has been sunk to the depth of twenty-feet, and will be further excavated to the depth of sixty-two feet, when the excavation beneath the river will be commenced. The machinery for the work is now in position, and it is stated that the excavation of the shaft will be completed within twenty days. The eastern grade of the tunnel is two in a hundred feet, descending from Jersey City, then ascending on the New York side two in a hundred feet. As soon as the shaft is sunk to the required depth a few feet will be excavated in the tunnel, when an iron cylinder with hinged doors will be inserted, so that the laborers can proceed with the work. Compressed air will be forced from the surface into the cavity. Very little blasting will be necessary, the first vein of rock being 1,100 feet from the New York side, and the rock is soft. The depth of earth over the masonry will not be less in any part than thirty-five feet, so that no injury can occur from the anchorage of vessels. The cost of this stupendous enterprise will be $15,000,000, of which $10,000,000 has been already subscribed. After several legal contests the Hudson River Tunnel Company has been triumphant, and the president, Colonel HASKIN, declares his determination to proceed vigorously with the work.—*New York Herald.*

BORAX LAKE, PANAMINT VALLEY, CALIFORNIA.—Mr. D. SEARLES has extensive works at Borax Lake, for the manufacture of borax. The lake is situated in Panamint Valley, some 30 miles south from this place. The works are turning out 90 to 100 tons of refined borax per month. There are now on hand 4,000 sacks ready for shipment, the sacks averaging 85 pounds each. Mr. SEARLES says that GEORGE HEARST and others are working some very fine mines right across the valley from the borax works, in the Panamint range, and they have now on their dumps some 15 tons of high grade ore going from $1,000 to $2,000 in silver. The ore is fine milling, being freely interspersed with horn silver. This is an old district known as the "Slate Range," and the mine now being worked is the old Antrim, which in 1862 sold as high as $100 per foot. The mine is relocated by HEARST, REESE and HAGIN, of San Francisco, and is now called the Alta. A tunnel has been run in on the Alta some 300 feet, which brings them below the surface 75 feet; at the face of the tunnel a winze has been sunk to a depth of 30 feet, good ore being found for the entire depth. The vein in the tunnel is 18 inches in width but at the bottom of the winze it is two feet in width. On the Francis, Morrow, and San Francisco ledges, a series of ledge sone above the other in the hill, a tunnel has been run 600 feet, and it is thought the first ledge will be struck in about 20 feet further, which will bring them to a depth of 400 feet. The three ledges lie one above the other and 150 to 200 feet apart, so that when the tunnel shall have reached the second ledge it will be at a depth of about 550 feet, and the third about 700 feet. On the Lake View a tunnel has been run in about 100 feet, and some 25 feet further is yet to run to strike the ledge. Some six tons of ore have been taken out from the incline on the ledge, which was sent to San Francisco for reduction, yie ding $1,100 per ton. The four last mentioned claims are the property of SEARLES BROS., SKILLING & GRASSARD. These were the old original locations made in the Fall of 1861, the parties locating them having held possession and kept two or three men to work all the time developing them. Some three miles below the SEARLES BROTHERS works are other works, being run by THEOPHILUS DODGE for an English company, AUTHOR ROBOTTOM being at its head. He employs five Chinamen and four white men. The SEARLES BROTHERS employ 26 Chinamen and 16 white men. Mr. DODGE started his works last November, and are now just getting in shape to crystallize. They have made no shipments as yet.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending July 22

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co	—	971,972	59,016	1,771,266
D. L. and W. RR. Co	21,167	710,816	68,992	1,720,763
Penn. Coal Co	3 646	480,670	28,208	717,154
L. V. RR. Co	12,162	475,432	27,109	483,453
P. and N. Y. RR. Co	—	12,649	1,598	64,657
C. RR. of N. J	10,932	599,224	47,716	427,503
Penn. Canal	12,653	166,611	13,773	49,766
	59 560	3,416,818	246,412	5,230,572
Lehigh Region.				
L. V. RR. Co	42,707	1,220,987	80,349	394,813
C. RR. of N. J.	12,348	585,872	35,372	68,859
D. H. and W. B. RR.	1,557	22,173	1,832	37,855
	56,612	1,829,032	117,553	531,537
Schuylkill Region.				
P. and R. R. RR. Co	2,163	2,052,381	182,581	1,354,404
Shamokin & Lykens Val.	18,626	415,180	30,840	638,850
	21,789	2,483,361	213,421	1,993,254
Sullivan Region.				
Sul. and Erie RR. Co	—	26,409	—	5,557
Total	137,961	7,760,820	577,386	7,760,920
Increase	—	100	—	—
Decrease	439,425	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

Perth Amboy business :

	Tons.
Received for the week	12,689
Shipped for the week	17,116
On hand July 22	79,991

Freights to Boston, 9 c ; Hartford, 90c.; New Haven, 60c.; New York, 35c.

The decrease of shipments of Cumberland Coal over the Cumberland Branch. and Cumberland and Piedmont Railroads amounts to 321,765 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	6,325	122,604	19,840
" " " South Amboy	10,547	229,051	41,150
Shipments at Coal Port (Trenton)	8,248	118,402	15,110
" " South Amboy	10,572	235,229	108,818

Receipts of Coal at Boston. for week ending July 21, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	1,962	73,419	91,420
Philadelphia	10,310	560,832	403,389
Baltimore	4,210	125,976	150,580
Other places	5,329	263,052	221,723
Great Britain	—	4,620	2,224
Nova Scotia	594	19,667	23,425

Shipments of Coal from Richmond, from January 1, 1876, to July 22, 1876, inclusive :

	Week.	Year.
By Cannelton Coal Company	1,149	18,681
" Peytona " "	—	8,845
" Blacksburg " "	—	4,387
" Coal Valley " "	—	7,216
" Other " "	152	4,887
Total tons	1,301	44,248

Coal Shipped at Pictou, N. S., for week ending July 15 1876 ..... 5,109 tons.
Previously exported ..... 62,553 "
Total to date 67,662

The Production of Bituminous Coal for the week ending July 22, was as follows :

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb	52,668	917,918
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	6,722	180,439
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3 946	88,511
*East Broad Top	1,593	39,122
Clearfield Region, Pa.		
*Snow Shoe	695	30,565
*Tyrone and Clearfield	23,832	614,383
Allegheny Region, Pa.		
*Pennsylvania RR	4,246	114,358
Pittsburgh Region, Pa.		
*West Penn. RR	3,803	108.741
*Southwest Penn. RR	1,292	32.551
*Penn. & Westmoreland gas coal, Pa. RR.	16,645	413.362
*Pennsylvania RR	1,314	157.343

* For the week ending July 14.

The Production of Coke for the week ending July 14.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
West Penn. RR	816	25 271
Southwest Penn. RR	12,274	269,801
Penn. & Westmoreland Region, Penn. RR.	974	24.732
Pittsburgh, Penn. RR	1,430	100,904
Total	15,494	420,708

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, July 28, 1876

Anthracite.

The talked of advance of 15c. per ton for the month of August has brought an increased business to nearly all, but it is very evident that the moment the advance shall nominally exist quietness will again rule. Although business is temporarily somewhat improved, it is still quite unsatisfactory in amount.

Since our last the Lehigh and Wyoming operators have had a meeting at which those who ship over the Lehigh Valley Railroad resolved to suspend operations during two weeks in August, that their excess in shipments to tide-water over the allotment of the Combination may be extinguished ; and it is now said that the Combination is again upon a safe basis. We feel assured there will be no complete rupture in this organization during the remainder of the year, but we have no faith in the programme being any more religiously carried out than it has been up to the present time. Prices are very irregular, and almost any class of buyers can procure concessions by a thorough canvas of the market, while an important order can hardly pass an office without the offer of very liberal concessions, provided the buyer be discreet.

The Lehigh Valley Railroad Company as a transporter owes no allegiance to the Combination, and will not recede from the position it assumed early in the year, to wit, that it has no right as a public carrier to refuse freights offered it. The action of the coal operators on its line was entirely independent of the railroad company, and in agreeing to suspend operations two weeks in August they are simply meeting a necessity of the trade which will also oblige the other companies to suspend for an equal length of time ; so that it does not appear probable that the over-production complained of on this line, and which now amounts probably to 150,000 tons will be equalized by this action of the operators. We nevertheless have faith in the wisdom of those who control the trade, and believe in the continued existence of an agreement which is so essential to the prosperity of every producer and carrier of coal.

Of the total production during the three weeks ending July 22, the collieries on the line of the Lehigh Valley Railroad, produced over 27 per cent., while last week they figured to the extent of 40 per cent. of the week's shipments, having shipped more than half as much as during the previous week, although last week was nominally one of "total suspension"

As the business of the several companies was either largely increased or decreased during the first six months of last year, it may be of interest to make a comparison of the production on the lines of the different carrying companies from Jan. 1, to July 22, of 1875 and 1876. The following companies show an increased production this year: Lehigh Valley Railroad, 62 per cent. ; Central Railroad of New Jersey, 125 per cent. ; Philadelphia and Reading Railroad, 52 per cent. The following companies show a decreased production for this year : Delaware and Hudson Canal Company, 46 per cent. ; Delaware, Lackawana and Western Railroad, 59 per cent. ; and the Pennsylvania Coal Company, 33 per cent.

Our statistics of anthracite production show this year's output to be but one hundred tons ahead of the production at the corresponding period in 1875. In our issue of the 15th inst., we showed that the average weekly production during the last half of 1875, amounted to 550,000 tons, while the average weekly output during the first half of this year was but 265,000 tons, so that after allowing liberally for the usually increased business of the Autumn months, it seems highly probable that our production of anthracite during the remainder of this year will be at least 150,000 tons a week less than it was in 1875 ; or, in other words, that the production of anthracite will, this year, be about 3,000,000 tons less than it was last year, and 5,000,000 tons less than in 1873. These figures are certainly suggestive, if not alarming, when we consider that the production of bituminous coal throughout the country has steadily increased during the same period, and its consumption in the chief markets for anthracite has been maintainted during the past year, and increased over the figures of 1873. It is true the depressed condition of the iron trade has borne more heavily on the anthracite than on the bituminous trade, but the usual outlets for soft coals have also been curtailed to a large extent since the panic, and there is good reason to believe the decline in the consumption of ahthracite is in no inconsiderable degree, owing to the substitution of bituminous coal. The ultimate causes of this state of things, which we have many times suggested, demand the most careful consideration of the able minds that control this great industry.

Our Montreal correspondents note sales in that city of Welsh anthracite coal at $4, which cost delivered in that city, $6 per ton.

Bituminous.

We are unable to learn of any important transactions taking place. The Clearfield region, although doing a very fair business, is not shipping quite so much coal as earlier in the year, while the Cumberland Region has given a surprise in showing shipments for the last week in excess of those for the corresponding week of 1875. This has been brought about by an abundance of vessels and low rates of freights at Georgetown. The mining companies have been hurrying forward their coal to take advantage of the situation, and many of them with prospects of exhausting their orders at an early day. Upon the whole, the statistics of the production of bituminous coal are very encouraging. As this is almost entirely a manufacturing fuel, it is safe to say that the consumption, with those who were using it in 1874 and 1875, has greatly decreased, hence a large portion of the trade that has already been done this year, must have been with those who have heretofore been using anthracite, as remarked above.

CAPE BRETON —A Press dispatch, dated Halifax, July 27, says : "Serious trouble is anticipated at the Sydney (C. B.) coal mines. The strikers are resolute and as determined as ever, and resist the cutting or shipping of coal. A company of volunteers were sent from Sydney to the mines this morning. Manager BROWN, of the Sydney mines was shot at yesterday. Last night the miners tore up the railroad track and emptied the coal-wagons which had been filled for the steamer Delta for this port. A number of men who went in the steamer from here refused to work to-day. The strikers are acting together, and are perfectly sober."

The following is an extract from a private letter, dated July 14 :

"The strike at the Sydney Mines still continues. The colliers have vacated their houses and are now encamped out on the road-side in front of the houses formerly occupied by them. They still exhibit a good deal of determination, but it is doubtful if they can hold out until the fall weather, particularly if they find the company still determined not to yield in the position they have assumed.

"The Block House Mine, at Cow Bay, are shipping about 500 tons per day, principally for New York."

Coal Trade of Philadelphia.

PHILADELPHIA, July 27, 1876.

The rumors about the breaking of the Combination—most of which originate with stock operators—are affecting the confidence of buyers, already pretty well shaken by the advance of 15c. on the 1st of August—has not brought many orders. There is a determination amongst purchasers to continue the hand-to mouth policy. The production has grown to be so much ahead of the demand that a judicious and equitable curtailment of it would be welcome all round, but the system now adopted and the high prices decreasing instead of encouraging consumption, are leading to such disastrous results that it is felt by many that any change would be for the better. The supply of cars in the Schuylkill Region is growing daily beautifully less. Freights to the eastward remain the same, but are 5c. to 10c. better South.

Wholesale Prices of Anthracite Coal for July, f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	4 75	4 85	4 95	5 05	5 65	4 95
Pittston at Newburg	4 60	4 70	4 80	4 90	5 50	4 80
Wilkesbarre at Port Johnston	4 75	4 85	4 95	5 05	5 65	4 85
Plymouth, R. A.	....	....	4 95	5 15	5 75	4 95
Susque. Coal Co. at Amboy W.A.	4 75	4 85	4 95	5 15	5 65	4 95
Kingston at Hoboken	4 75	4 85	4 95	5 15	5 65	4 95
Lehigh Coals.						
Old Company at Port Johnston	5 25	....	5 05	5 05	5 65	4 95
Old Company's Room Run "	5 25	....	5 05	5 05	5 65	4 95
Sugar Loaf, Hobok. & Amb. "	5 25	...	5 05	5 05	5 65	4 95
Lehigh Coal Exchange "	5 25	....	5 05	5 05	5 65	4 95
Honey Brook Lehigh	5 25	....	5 05	5 05	5 65	4 95
Beaver Meadow at South Amboy	5 25	....	5 05	5 05	5 65	4 95
Schuylkill Coals at North 9th st., Brooklyn, E. D.†						
Schuylkill white ash	4 75	4 85	4 95	5 05	5 65	4 85
Schuylkil red ash	...	....	....	5 15	5 75	4 85
Shamokin white and red ash	....	...	....	5 25	5 75	4 85
Lorberry	....	...	5 85	5 85	5 85	4 90
Lykens Valley	....	....	6 30	6 30	6 30	5 35

* Contractor's prices are 20c. per ton less.

†The prices of Schuylkill coals for shipment from Philadelphia are 35c. per ton less than at Brooklyn.

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to N. York.	40c.
" " South Amboy to New York	30@35c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00

Red Bank Cannel Pa. at Philadelphia....	8 00	8 50
" " South Amboy..	8 50	....
" Orrel.....	6 00	6 50
Youghiogheny, Waverly Co., at Balt....	4 25	5 75
Despard, West Va..	4 50	6 00
Murphy Run, West Va., at Baltimore..	4 50	6 00
Fairmount, West Va., " " ...	4 35	6 00
Newburgh Orrel, Md. " " ...	4 50	6 00
Cannelton Cannel, W. Va.....	....	10 00
" Splint, " at Richmond.	4 50	6 00
" Gas Coal at Richmond	4 00	5 50
Peytona Cannel, W. Va at Richmond...	8 50	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va ...	3 50@3 75	4 90
Cumberland, at Baltimore	3 65@3 80	5 10
Clearfield f.o.b. Canton, Baltimore....3 75@....		5 25

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 95, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at South Amboy, N.J., 4 60; New York, 5 00.

Clearfield and Alleghany, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 95; at Greenwich, Phil., per 2240 lb., 3 75@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne.....	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool....	26/	13 00
Ince Hall Cannel " ...	42/	18 00
" Gas Cannel " ...	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/ Gold.	7 50
Block House, at Cow Bay, N. S	2 00	4 75
Caledonia, at Port Caledonia.....	1 50	4 25
Glace Bay, at Glace Bay.....	1 50	4 25
Lingan, at Lingan Bay.....	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Baltimore, Md. July 27, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 72	$4 57
Broken.....	5 10	4 95
Egg.....	5 20	5 05
Stove.....	5 61	5 46
Nut.....	4 76	4 61
Shamokin. (red or white ash), and "Boston," free burning white ash,		
Egg.....	5 30	5 10
Stove.....	5 60	5 40
Lykens Valley, red ash,		
Egg and stove.....	6 15	5 78

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. .....$5 35@8 00

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point.	3 80@4 00
West Virginia Gas f. o. b. at Locust Point	
Youghiogheny Gas, f. o. b. at Locust Point.....	

Boston. July 22, 1876.

COAL continues to have a small, steady, immediate want sort of trade, from the scarcity of water on the mill streams. The demand shapes toward small cargoes now, the prospect being that the water difficulties will continue into September. The market, as a consequence, is a little steadier, and spot cargoes of good mines in either Anthracite or Bituminous are selling closer to the Combination quotations than at any time previously. The yard demand is trivial, the dealers still being quite indifferent to stocking up. Freights are unchanged, 90c being the basis from New York.—*Commercial Bulletin.*

Buffalo, N. Y. July 27, 1876.

Reported by our Special Correspondent.

Deliv'red at	Elmira Afloat	Ithaca. Afloat.	Syracuse Afloat.	Rochester. Afloat	Rochester. ret. del.	Oswego f.o.b.
Grate.....	$4 05	$4 35	$4 50	$5 20	$6 45	$5 45
Egg.....	4 05	4 35	4 50	5 20	6 45	5 45
Stove.....	4 45	4 00	4 95	5 65	6 90	5 90
Nut.....	4 15	4 50	4 65	5 35	6 60	5 60

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 95	$5 45	$5 95	$6 70
Egg	5 95	5 45	5 95	6 70
Stove	6 40	5 90	6 40	7 15
Nut	6 10	5 60	6 10	6 80

Cleveland, O. July 27, 1876.

Specially reported by Messrs. BATES & MARTIN.

Herewith find quotations of our market:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	For vessels,	On cars.
Youghiogheny Gas Coal.....	$4 10	$4 00
Cannel	4 25	4 15
Blossburgh	$5 00	$5 00
Briar Hill Block Coal	3 50	3 25
Straitsville Coal Co., lower vein	3 00	2 90
" " whole "	2 90	2 80
Hocking Valley.....	2 90	2 90
Massillon	3 00	3 00
Tuscarawas Valley.....	2 65	2 60
Columbiana.....	2 65	2 60

Office of CLEVELAND COAL EXCHANGE,
80 Seneca Street, June 3d, 1876.

PRICES TILL FURTHER NOTICE.

	1 to 10 tons.	10 tons upw'd.
Massillon, Brier Hill and Mineral Ridge, lump.	$4 50	$4 25
" " " " nut ...	4 00	3 75
Straitsville Lower Vein, Hocking & Shawnee, l'p.	4 00	3 75
" " " " nut	3 50	3 25
Del Carbo and Rich Hill, lump.....	3 75	3 50
" " " " nut.....	3 25	3 00
Maple Hill, lump.....	3 50	3 25
" " nut.....	3 25	3 00
Columbiana, lump.....	3 25	3 00
" nut.....	2 75	2 50
Lackawanna and Wilkesbarre, egg and grate ...	7 50	7 30
" " stove	8 00	7 75
" " chestnut	7 75	7 50

No Anthracite coal to be sold for future delivery except it be subject to Exchange price at time of delivery.

H. E. CHUBB, Secretary.

Chicago, Ill. July 26, 1876.

Prices remain unchanged.

Cincinnati, O. July 27, 1876.

Reported by our Special Correspondent.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat.....	7½@8c.	—
Pomeroy coal..... "	5 @6c.	—
Kanawha " ..... "	7 c.	—
Cannel coal, according to quality "	11 @16c.	—

The following are the retail prices delivered

Youghiogheny .....10c.	—
Pomeroy ..... 9c.	—
Cannel .....14@22c.	—
Kanawha Semi-Cannel..... ..10c.	—
Anthracite, per ton..... ..... 10 50@11 00	—
Coke, at yard..... 7c.	—
Coke, hard and soft, delivered..... 9@10c.	—

Erie, Pa. July 27, 1876.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump.....$3 75	Beaver lump... .....$3 50
Midway..... ..... 3 25	Cat Fish..... 3 00

Indianapolis, Ind. July 27, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton....$2 50	Peytona cannel, per ton. 5 75
Brazil Block, " 2 50	Indiana Cannel..... 4 50
Highland, grate, " 2 25	Hocking Valley..... 4 25
Block coal, nut, per car..18 00	Youghiogheny 4 50
Highland " ...18 00	Blossburg (smithing)... 6 50
Block Slack " ...17 00	Piedmont " 6 50
	Gas coke, per bushel..... 10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken..... ....$8 35	Nut 8 50
Egg..... 8 35	Stove..... 8 75

Lehigh Anthracite.

Broken..... 9 75	Nut..... 9 50
Egg..... 9 75	Stove..... 10 00

Retail, per bushel, delivered.

Sand Creek..... .... 15c.	Block Nut, steam..... 8
White River.... 13	" Slack, " 7
Brazil Block.....14	Peytona Cannel.....28
Highland grate..... 13	Virginia " 27
Block Nut, domestic use.12	Youghiogheny.....20
Highland Nut, " " .12	Blossburg..... ...26
" " steam..... 8	Piedmont.....26

GAS COKE (measured.)

Crushed.....15c.	Lump.....12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes).....$9 75 per ton,	
Lehigh, retail .....$11 50 per ton.	

Louisville, Ky. July 27, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh.....	12c.	Pine Hill....	—
Raymond City.....	9c.	Kentucky.....	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh.....	12c.	Peytona Cannel .....20@22c.	
Raymond City.....	11c.	Buckeye " .....20c.	
Pine Hill	13c.	City-made Coke.....10c.	
Kentucky.....	10c.	Auth., per ton, $10 00 to 10 50	
Screened ittsburgh per load.....		$3 00	
Screened Raymond City.		2 75	
Pine Hill (Kentucky).....		2 75	
Cannel.....		$5 to 5 50	

Milwaukee, Wis. July 27, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump.....$10 00		Briar Hill, select.....	$8 00
Lehigh Prepared 11 00		Blossburgh	8 00
Lackawanna (all sizes).. 10 00		Cannel	8 00
Pittston..... 10 00		Pittsburgh	7 00
Scranton..... 10 00		Steam coal...	7 00

New Orleans, La. July 22, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburgh coal, retail, per bbl	....
" wholesale	30c
" steamboats, per box.....	40c.
" to manufacturers, per bbl.....	45c.
" shipments, per hhd.....	$5 25
Anthracite, wholesale, per ton.....	....
" retail, "	12 00
Virginia Cannel, per bbl.....	80c.
Scotch " "	8c.
Mt. Carbon, wholesale, per bbl.....	...
" " retail, "	50c.
St. Bernard wholesale, per bbl	30c.
" retail, "	50c.

Richmond, Va. July 24, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Prices are now as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel.....	$9 00	New River Bituminous,	$4 00
" semi-Cannel..	4 00	Clover Hill Coal.....	3 50
Coalburgh Splint.....	4 00	James River Bitum ..	3 30
Lewiston "	4 00	" " Carbonite,	5 00
Kanawha Gas coal.....	3 90		

San Francisco, Cal.

From the *Commercial Herald*, July 20 1876.

Imports from Jan. 1st to July 16th:

	tons.		tons.
Anthracite.....	8,424	Vancouver Island...	59,663
Australian.....	43,170	Rocky Mountain....	132
Coos Bay.....	21,559	Seattle	55,424
Cumberland.....	3,749	Bellingham Bay....	12,670
English.....	11,950	Chili.....	2,076
Mt. Diablo.....	54,601		

Imports for six months from all ports of supply show an increase as compared with same time last year of 11,679 tons, the greatest increase being from the Seattle mines (Washington Territory) and the mines of British Columbia, Vancouver Island. The greatest falling off in supplies has been from the California (Mt. Diablo) mines, and then from England and New South Wales, these two about equalizing that from New South Wales. We submit herewith full details of receipts. The last cargo from Newcastle, N. S. W., per *Delta*, 715 tons, sold at $8.50, which must be called the market price of the day. Arrivals for the past week embrace the following: *El Dorado*, 1,900 tons Seattle; *Whistler*, 638 tons Sydney; *Anahuac*, 200 tons New York. As before published, English Steam to arrive next Autumn has been sold as low as $7@7.50. California (Mt. Diablo), is held at $5.75 for screenings, $7.75 for coarse; Australian, $8@8.50, latter for *Wallsend*; Coos Bay, Vancouver, Belingham Bay, Seattle, etc., $8@9; Anthracite, $12@14: Cumberland, $14@16—all for spot parcels. The receipts from Coos Bay are now being stored rather than submit to the heavy decline. The Wellington Mine has reduced its working force one-half or more. There is a cargo of Nanaimo now upon the market from Buckley's Mine, which the holder finds it difficult to sell. The cargo of Anthracite, per *Edward May* from Philadelphia (310 tons), sold at $12, which is an advance of $2 on previous sales.

Montreal. July 21, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Supplies of coal of all kinds continue to be far in excess of the demand, and sales are continually being forced at prices below the cost of importation. Welsh anthracite, costing $6, has been sold at $4. Scotch coal has come out in large quantities, 103 cargoes being reported to date. This sells so low that the Pictou and Cape Breton coals are almost shut out of the market, and most of the mines are doing a small business, or closing down. Anthracite shows no signs of advancing. Stocks are large, and great depression exists among consumers. We quote:

Wholesale per ton of 2240 lb.

Scotch Steam.....	$4 25	Cape Breton Steam.....	$3 75
Pictou "	4 25	Newcastle Smiths.	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut.....	6 25
Stove.....	6 75		

Toronto, Ont. July 24, 1876.

Chestnut..... .....$7 25	
Stove..... ..... 7 50	
Egg and grate..... 7 25	
Bituminous coal for domestic use..... 6 00	
" " steam.....	3 50@5 50
Lehigh Lump and broken.....	7 50
Blossburgh.....	6 30

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey...	2 36	2 22	2 78	2 69	2 92
‡ Mauch Chunk, Pa., via Central Railroad of N. J.....	14	..	56	47	70
‡ Philipsburg, N. J., (46 miles).....	89	75	1 31	1 22	1 45
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	2 00	1 86	2 42	2 33	2 56
High Bridge, N. J.....	2 40	1 95	2 80	2 54	2 72
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 31	2 22	2 69	2 69	2 92
Jersey City, N. J., (121 miles) and New York, via L. V. RR ...	2 30	2 16	2 63	2 63	2 86
Andover, via Delaware, Lackawanna and Western RR	3 30	3 16	3 76	3 69	3 99
§ Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division.....	2 65	2 45	3 05	3 04	3 34
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR..... $2 14

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware, Lackawanna and Western RR., Morris and Essex Division..... 1 10

From *Lackawanna Junction* to **Auburn, N. Y.*, (191 m.) for shipment, via Southern Central R.R. in connection with Pa. and N. Y. R.R..... ..... 2 41

From *Lackawanna Junction* to ‖*Weedsport* (201 m.), for *Rochester and Charlotte and Erie Canal*..... 2 47

From *Lackawanna Junction* to *Sterling* for *Oswego, N. Y.*.. 2 50

‖ To this point for all places between Rochester and Buffalo the rate is 2 53

* The rate to this point for Syracuse is..... 2 08

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles and from *Mauch Chunk* it amounts to 106 miles.

Freights.

Representing the latest actual charters up to July 28, 1876.
Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	†80	....	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	1 60	....	90
Bath, Me	1 00@1 35	1 35	1 40	90
Baltimore	....	....	....	....
Boston, Mass	1 15@1 30	1 45@1 50	145-50	90
Bridgeport, Ct	†1 00	1 40	....	55
Bristol, R. I	....	....	....	80
Cambridgeport, Mass.	§1 25@1 35	....	....	90
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	§1 15@1 25	....	....	§90
Fall River	1 15@1 20	1 40	1 35	80
Hackensack	*70	....	....	....
Hallowell, Me	....	....	....	....
Hartford	*70	....	1 65	90
Hoboken	†70	1 30	1 15	40
Hudson	....	....	1 35	....
Jersey City	70	....	1 15	40
Lynn, Mass	....	....	....	†1 00
Middletown	....	....	....	1 00
Mystic	....	....	....	....
Newark	71	....	1 30	....
New Bedford	1 15@1 25	1 40	1 40	80
Newburyport	1 25	1 60	1 55	1 00
New Haven	1 00	1 40	1 30	55
New London	1 20	1 35	1 35	65
Newport	1 10@1 20	....	....	80
New York	1 00†	1 30	1 25	40
Norwalk	1 00	1 50	....	60
Norwich	1 20‡	....	1 40	70
Pawtucket	1 25‡	....	....	....
Philadelphia	....	....	....	....
Portland	1 00@1 20	1 35	1 40	90
Portsmouth, N. H.	1 25@1 30	1 60	1 60	1 00
Providence	1 10@1 20	1 40	1 35	80
Poughkeepsie, N. Y.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	1 70	....
Sag Harbor	....	....	....	1 00
Salem, Mass	1 20@1 25	1 45	1 50	90
Salisbury Pt., Mass	....	....	....	....
Stamford	*1 00	....	....	60
Stonington	....	....	....	80
Taunton	....	....	....	....
Troy	†80	....	....	....
Warren, R. I	....	....	....	80
Wareham	....	....	1 45	....
Weymouth	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles), the legal charge is 2 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 75 cents per net ton.

From Cumberland to Baltimore (178 miles) $2.02 per ton of 2240 lb., or $1.80 per net ton (⅛ cent per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, $1.10. Tolls, 46 cents.

From the Mines to Piedmont, 4 cents per ton of 2240 lb. per mile on distances less than 4 miles, and 3 cents per ton per mile on distances over 4 miles, and 2 cents per ton per mile on distances over 10 miles.

From Piedmont to Baltimore (206 miles) $2.34 per ton of 2240 lb., or $2.08 per net ton.

From Osceola to Greenwich, Phila. (say 248 miles) per T. & C. RR, per ton bituminous coal of 2000 lb., less drawback of $1.46. $2.15; rate per gross ton, $2.60.

From Osceola to South Amboy, N.J., (317 miles) per 2000 lb., $4.03, less drawback, $1.03; rate per net ton, $3; add 12 per cent. for gross ton, 36 cents, terminal expenses, shipping, 20 cents; rate per gross ton, $3.56.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, July 28, 1876.

American Pig.—The Thomas Iron Company report sales aggregating about 1,000 tons of Nos. 1 and 2 foundry iron at $22 and $20 respectively. The condition of trade shows no change. Forge continues to be very scarce, and No. 2 foundry is getting to be in short supply and is somewhat firmer. We quote No. 1 foundry at $22; No. 2, $20; and forge at $19@20.

Scotch Pig.—The business doing in this article is very light, and prices are considerably depressed. We note sales in 50 ton lots of Eglinton at $26.50; Coltness, $28.50; and Glengarnock, $27.50.

Rails.—There are no transactions reported in this market, but there appears to be a fair amount of business doing throughout the country. We quote iron rails, at mills, at $39@42, and steel at $56@61.

Old Rails.—We are reported sales aggregating 300 tons at $21.50.

Scrap.—This article is exceedingly quiet, and is nominally quoted at $28.

Baltimore. July 26, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

Our iron market remains unchanged—business dull and transactions light, at about the following prices:

Baltimore Charcoal	$30@35	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@34	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C. B. Blooms	65@67 50
" No. 2	21@22	Refined Blooms	50@55

Boston. July 22, 1876.

PIG continues to sell in a trivial, irregular way, the market showing little actual strength to cash buyers although there is certainly a strong stand at 50c a ton better prices than were current in May. The sales are chiefly of No. 1 for machinery purposes, No. 2, which goes largely into buildings, &c., being ruled relatively out of the market by the scarcity of bricks and Eastern lime.

BAR has had a fair jobbing trade, with rather more uniformity to prices. The stocks generally are quite small, but as yet few orders (July being the order month) have been placed.—*Commercial Bulletin.*

Chattanooga, Tenn. July 25, 1876.

Specially reported by J. F. JAMES. pig iron broker, etc., 233 Market Street.

The usual four months is given on quotations below:

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@ 22
" " " " No. 2 foundry	20@ 21
" " " " gray forge	17@ 18
" and Georgia coke, No. 1 foundry	18@ 19
" " " No. 2 foundry	17@ 18
" " " " gray forge	15@ 16
White and Mottled	14@ —
Tennessee and Georgia cold-blast car wheel	24@ 25
Alabama " "	24@ 25
Old Rails	cash 22 00
Cast Scrap	" 12
Wrought Scrap	" 16

Cincinnati. July 25, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

There has been no change in the market since our last report. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	—4 mos
" No 2, "	23 00@	—4 mos
" Mill	21 00@	—4 mos
Tennessee, No. 1, Foundry	23 00@24 00	—4 mos
Tennessee, No. 2, "	22 00@23 00	—4 mos
" Mill	21 00@	—4 mos
Missouri, No. 1, Foundry	.... @	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@	—4 mos
" No. 2, "	20 50@21 00	—4 mos
Ohio Mill	19 50@20 00	—4 mos
Missouri, No. 1 Foundry	25 00@26 00	—4 mos
" No. 2, "	24 00@25 00	—4 mos
" Mill	23 00@24 00	—4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos
Tennessee "	28 00@32 00	—4 mos
Missouri "	32 00@35 00	—4 mos
Alabama "	28 00@32 00	—4 mos

BLOOMS.

Charcoal	60 00@ 75 00	—cash

SCRAP IRON.

Cast	50c.@ 85	—cash
Wrought	1 00@1 50	—cash

Cleveland, Ohio. July 25, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@....
No. 2, " " "	26 50@....
No. 1, Anthracite	25 50@....
No 2, "	23 00@....
No. 1, Bituminous	25 00@....
No. 2, "	23 00@....
American Scotch, No. 1, Cherry Valley	27 00@....
" " B—1, " "	26 00@....
" " No. 2, " "	24 00@....
No. 1, Massillon	26 00@....
B—1, "	25 00@....
No. 2, "	22 00@....

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 00@....
No. 4 " " "	27 00@....
Nos. 5 and 6 "	27 00@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	27 00@....

FORGE IRON.

No. 1, Gray	22 00@....
White and Mottled	2C 00@....

Louisville. July 25, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is without change. Consumers still adhere to the hand to mouth policy, and their stocks in consequence are small. With few exceptions the stock in first hand is also small, so that when trade does become active it must almost necessarily cause an advance in prices.

The usual time, four mos., is allowed on the quotations above:

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@26 00
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	20 00@21 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00
No. 1, Mill, from " " " " "	20 00@21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00
No. 2, " " " " "	21 00@22 00
No. 1, Mill, " " " " "	20 00@21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	22 00@23 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " " "	19 00@20 00
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	24 00@25 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	28 00@30 00
" " Alabama and Georgia Ores	28 00@38 00
" " Kentucky Ores	28 00@38 00

Milwaukee. July 25, 1876.

Iron remains much the same—sales small.

per ton of 2,240 lb.

Frankfort L. S. Charcoal, No. 1	$28 00
" " " No. 2	27 00
" " " No. 3, 4 & 5	25 00
" " " No. 6	25 00
Mil. Anthracite L. S., No. 1	27 00
" " " No. 2	26 00
Wisconsin Iron, No. 1	26 00
Mahoning Valley Bit's No. 1	32 00
" " " No. 2	30 00

Pittsburg, Pa. July 26, 1876.

Specially reported by A. H. CHILDS.

The condition of the market has not varied much for several weeks. The mills generally are carrying light stocks, and for the most part buying only for immediate wants. There has been some improvement in the demand for Foundry iron during the past two weeks. Quotations are unchanged.

No. 1 Foundry	24@25—4 mos.
" 2 "	22@23 "
Gray Forge	21@22 50 "
White and Mottled	18@20 "
Warm blast Charcoal	23@30 "
Cold blast Charcoal, Western	40@45 "

Richmond, Va. July 24, 1876.

Reported by ASA SNYDER, Esq.

Charcoal pig iron is dull and the market weaker, although as yet sales have not been made below quotations.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " " 2 X	21 to 22
" " " " " " 3	20 to 21
" Anthracite 1 X	— to —
" " 2 X	— to —
" " 3	— to —

San Francisco, Cal.

From the *Commercial Herald*, July 20, 1876.

Sydney block tin has been sold at 18@18¼c. The arrivals of pig iron from Oregon continue to come forward in limited quantities, and the price obtainable about the same as No. 1 Scotch, say $30@32.50. The stock of pig iron is now very considerable, thought to be nearly double that of last year at this time, and the market correspondingly dull. Tin plate is in excessive stock; imports since January 1st, 105,000 bxs, one fifth more than for same period the year previous; prices rule low. The Selby lead works continue to turn out large quantities of pig, sheet, and bar lead, also lead pipe and drop s hot in quantities; prices remain the same as for a long time past.

St. Louis. July 25, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is still very dull. Prices are maintained, and there seems to be no disposition to lower them, as it would not induce consumers to buy beyond actual wants.

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon iron, A No	1.29@30
" " " 2 "	23@24	" " B "	1.34@—
" " Gray Mill,	22½@23	" " "	2.28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " Tenn.	30@33
" " Gray Mill,	22@23	" " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms	50@65
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered Billets	75@80
" " " 2, "	23@24	Assorted Bar Iron	2 50, 60 days
" "Gray Mill,	21@23	No. 1 Wrought Scrap	90c. cwt.
H. R. Char. No. 1, Fdy.	25@26	Heavy cast "	70 "
" " " 2, "	24@25	Light " "	50
" " Gray Mill,	24@25		

Montreal. July 18, 1876.

We continue to quote: Pig iron Eglinton and Clyde $18@19.00; Carnbroe $19 00@20 00; American $21@23; Summerlee and Calder $19@20; Langloan and Gartsherrie $20@21; Coltness $20.50@21.00; Hematite $26@.27 Bar, per 100 lb., Scotch and Staffordshire, $2.10@2.20; best do., $2.30@2.40. Swedes and Norway $4.75@5.50; Low Moor and Bowling, $6.50@7.—*Monetary Times.*

THE SALT LAKE CITY SILVER ORE MARKET.

We are in receipt of Mr. MEADER's circular of the above market for the week ending the 22d inst. The only change which we note in the quotations as compared with the rates given in our last, is an advance of 2c. per oz., in the rate for silver.

"Silver has been a little more in demand at a small advance over last weeks quotations; still, purchasers are not disposed to anticipate any great advance in the price; hence the prices remain about the same for both ores and base bullion."

METALS.

NEW YORK, FRIDAY EVENING, July 28, 1876.

BUSINESS in every article on the list is exceedingly quiet, and prices, with one or two exceptions, are without notable change. There are some who anticipate a very good Fall trade, but the general indications are that trade will rule quiet during the whole year, with perhaps an occasional spurt, first in one article, and then in another.

Gold Coin.—During the week under review, gold has ranged from 111⅝ to 111⅞, and closed at 111⅞.

Copper.—The sales during the week have been very limited, at prices ranging from 19¾c.@20c., the latter being the closing price. The London market, according to the latest telegrams, showed a further decline, Chili bars being quoted at £70, and Best Selected, £76.

Tin.—To-day's cable information quotes pig tin, in London, as follows: Straits, £73 15/, and L. & F., £77. To-day's quotation at Singapore is $22.75, with exchange and freights higher. The present quotations at Singapore are relatively higher than the prices asked here. The Dutch Trading Company's sale took place on the 26th inst. There were 29,000 slabs sold at an average price of 43¼ florins, as against 45½ florins at the sale two months ago. The business doing in this market is very small. Quotations, in gold, are as follows: Straits and L. & F, 17c.@17¼c., and Banca, 21c.

Bullion.—The rising tendency of the London market, noticed in our last, continued until yesterday, when the closing quotation was 51⅛d. To-day, however, a decline has set in, and the closing price being 51d., and this price is cabled as being but "nominal." The price here is 110¼ per oz. Gold bars are quoted at ⅛@¼ per cent. premium.

Tin Plates.—A fair jobbing trade is doing at the following prices which are very firm: Charcoal tins, $7.25@$7.50, and ternes. $6.75@$7; coke tins, $6.25@$6.50, and ternes, $6. Another advance of 6d. is cabled from England to-day, making an advance of 1/ during the week under review.

Messrs. ROBERT CROOKS & Co., under date of July 13, says of tin plates: "The advance continues, and is extending to descriptions previously neglected. Buyers are not very ready for the most part, showing a disposition to follow the market; but, looking at the reduced make, the limited quantity in stock, and the comparative relations of even present figures with cost, the balance of evidence appears decidedly to point in the direction of a higher range, to last at least as long as the needy makers are occupied. This period may safely be put at not less than two months.

Lead.—Missouri soft lead laid down here is quoted at 7.10c. currency, or at the same figure that is asked for ordinary lead. There is but very little business doing in the latter, buyers not being willing to pay the prices asked. It now transpires that the Selby Company has lately sold 400 tons of its lead, for future delivery, at a price equal to 7c. currency.

Spelter and Zinc.—There is nothing doing in domestic spelter, which is quoted at 7¼c. currency. The combination to sustain the price of this article has been no more successful in its efforts than the Anthracite Coal Combination which is attracting so much attention. The same "outside" party appears in each case with his concessions to offer. Sheet zinc is quiet at 8¾c gold.

Antimony under a light demand is quoted at 15¼c. @15½c. gold.

Quicksilver.—This article is exceedingly unsettled. The London price has advanced to £9, while San Francisco has declined to 45c. There is no price quoted in this city.

The San Francisco *Commercial Herald* of July 20 says of Quicksilver: "London advices note a decline to £7 per bottle. Orders from Hongkong now in hand are, we believe, limited at 40c. for the steamer of the 1st proximo. Since our last report some holders have made sales at 41½c. and which to-day is the very general asking price, but it can be thought on more favorable terms. Receipts at tide-water for the past six months show an increase as compared with same time in 1875 of 6,649 flasks. This however does not show the full product of our coast mines, as some is shipped from the mines direct to Nevada and New York by rail, and therefore does not come into our tables at this time. To provide in some degree for this omission, we have received direct from some of our leading mines private information which enables us to make more full and complete statements than we could otherwise have done. J. B. RANDOL manager, under date of July 15th, reports the number of flasks of Quicksilver (76½ lb. each) produced at the mine of New Almaden during the first six months of 1876 as follows: January, 1,650; February, 1,500; March, 1,430; April, 1,700; May, 1,400; June, 1,140; total, 8,820 flasks. Shipments for the same period made directly to Nevada were 3,029 flasks. We have not made any shipments direct overland, but have made monthly shipments direct to Nevada, as shown in statement. Receipts of Quicksilver from the Sulphur Bank for six months ending 30th June, 1876; January, 525 flasks; February, 403; March, 501; April, 525; May, 770; June, 919; total, 3,643 flasks. The production of the New Idria Mine for the first six months of 1876 was 3,116 flasks. The Montana, for Mexican ports, carried 206 flasks, valued at $35,097; steamship *Australia*, for the Colonies, had only 70 flasks, and the *Oceanic*, for China and Japan, but 105 flasks. Steamer *Granada*, hence this day, carries 300 flasks for New York. 630 flasks for South America, 90 flasks for Mexico—total, 1,020 flasks.

Our monthly receipts of this article compare with 1875 as follows:

MONTH	1875 Bay, flasks.	1875 Coast, flasks.	1876 Bay, flasks.	1876 Coast, flasks.
January	1,605	2	3,877	281
February	3,284	309	3,864	62
March	3,779	465	3,762	154
April	3,718	100	3,313	317
May	3,298	303	4,954	304
June	3,776	320	5,368	362
Total	19,460	1,499	26,138	1,480

Exports by sea for the first six months of—

To	1875 Flasks.	1875 Value.	1876 Flasks.	1876 Value.
New York	12	$1,423	1,925	$87,456
Mexico	2,605	202,050	2,924	131,713
Chile	355	24,803	400	17,611
New Zealand	25	1,398	218	9,310
China	4,863	301,639	11,303	493,513
Japan	306	21,845	206	9,181
Central America	4	200	117	5,086
British Columbia	10	536	4	180
England	100	7,950	....	....
South America	1,020	96 518	857	37,336
Australia	352	21,959	473	20,975
Calcutta	10	550	....	....
Russsian Asia	3	195	....	....
Total	9,665	$680,764	18,427	$812,312

FINANCIAL.

New York Stocks.

FRIDAY EVENING, July 28, 1876.

THE dealings in the coal carrying shares during the week have been the most notable event worthy of record. The sales in these have been larger than probably ever before recorded in one week. They amounted to a total of nearly 110,000 shares, with violent fluctuations, the extreme range in a single instance showing a difference of 11 per cent.

New Jersey Central Railroad.—This stock has changed hands to the extent of 41,491 shares, between 61¾ and 72¾ as the extreme quotations, the final price showing a recovery of 1⅜ per cent. from the lowest figure, and a decline of about 10 per cent. for the week.

Delaware, Lackawanna and Western Railroad.—67,198 shares of this stock have changed hands, the quotations during the week show a gradual decline from 102⅛ to 93¼, seller 60 days, and closed to-day at 96⅞, an advance of 1¼ from the lowest regular quotation, and a decline of nearly six points from the low rate at which it closed in our last.

Delaware and Hudson Canal Company.—Only 504 shares of this stock have been sold, and even these did not come out unhurt in the general tumble, some shares having been sold down to 98, seller 30 days, the final regular price showing an improvement of 2 per cent. on this figure, and a decline of 4¼ per cent. from the quotation of the 21st inst.

The Consolidation Coal Company's stock exhibits no change in prices or sales worthy of special remark.

St. Louis and Iron Mountain Railroad.—100 shares of this stock changed hands at 17½. The earnings of this company from the carrying of iron and iron ore for the first week in July, were $3,100, against $5,128 for the same period last year, showing a decrease from this source of $2,028.

Mariposa Land and Mining Company's stock is neglected. The Trustees of this company have levied an assessment of $1 per share on the preferred and common stock, payable on the 7th of August. After that date it will be delinquent and liable to a charge of $3 each certificate for advertising sale. The tunnel, at last advices, was 1,675 feet long, and is producing ore from the south drift. Good pay, it is said, has been found in the new upraise shaft, and the mills are running full.

Cumberland.—The project is revived of building a narrow gauge road from Lonaconing, Md., to the Baltimore and Ohio Railroad near Cumberland, to serve the coal mines of the Cumberland region, now dependent upon the Cumberland and Piedmont road for transportation. It is estimated that the road could be built for $750,000, and it is said that responsible contractors have offered to build the road and take the greater part of their pay in its securities.

Shenandoah Valley Railroad Company.—At the annual meeting of this company, held at Winchester, W. Va., on the 19th inst., it was unanimously determined to approve and ratify the lease lately made by President MILNES (representing the Pennsylvania Railroad interest), of the Shenandoah Valley Railroad, from Staunton to Harrisonburg, and a committee was appointed to make any arrangement which they might deem practicable for a lease more permanent than the present one.

Erie Coal and Railroad Company. At the recent annu meeting of this company. The following officers were elected for the ensuing year: President, Henry G. STEBBENS; Secretary C. H. DEERING. Directors—E. M. CLYMER, Reading, Pa.: C. R. ARLY, Ridgeway, Pa.; A. MCKINNEY, New York; A. A. MARCH, New York; E. S. BOWEN, New York, and LEVERETT SALTONSTALL Boston.

Straitsville Cannel Coal Company. The annual meeting of this Company will be held on the 3d of August next.

Brevoort and Petroleum Company. The annual meeting of this Company will be held on the 1st proximo.

Chesapeake and Ohio Railroad.—The bonds of this company are neglected. A letter from Richmond, Virginia, says: "It seems to be understood that an order for the sale of the Chesapeake and Ohio Railroad will be entered at the October term of the court. It is highly probable that the road will be purchased by the bondholders under the first mortgage of the Chesapeake and Ohio Company. Prior to that is a mortgage for about a million or a million and a half on the old Virginia Central."

Quotations and Sales of Stocks and Bonds.

For the week ending July 28, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	240	230	230	100
Consolidation Coal Co	41	40	40	155
Spring Mt. Coal Co	55	55	55	100
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	20	—
Del., Lack., and West. RR. Co.	102⅛	94	96⅞	67,198
New Jersey Central RR. Co.	72¾	61¾	63	41,491
Delaware and Hudson Canal Co.	104	99	100	504
Quicksilver Mining Co. pref'd	—	—	15	—
" " " Common	—	—	13	—
Mariposa Land & Min. Co. pref'd	—	—	—	—
St. Louis & Iron Mountain RR.	17⅛	17⅛	17⅛	100
Lehigh & Wilkes-Barre Coal Co.	—	—	—	—
Total Shares sold				109,648
Sales for the week previous				11,450
Increase				98,198

* Nominal.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	1,000	@110⅛
" " " 7's Con'ble	J. & D.		@
Cent'l RR. of N.J., 1st M., New	F. & A.	1,000	@116
" " " 1st Cons.		79,000	99¾@101⅛
" " " Convert'le	M. & N.	40,000	@ 92
Lehigh & W.-B'e, Con. Guar'd.		121,000	87 @ 87⅛
Am. Dock & Imp. Mt. Bonds	J. & J.		@ 96½
Del. & Hud. Can., 1st M., 1891		1,000	@111
" " " 1884			@
" " " 1877			@
" " " Coup. 7's, 1894		4,000	@109
" " " Reg'd 7's, 1894			@
St. L. & Iron Mountain, 1st M	F. & A.		@
" " " 2d M	M. & N		@*79
Chesapeake & Ohio 6's, 1st M.		2,000	@ 26⅛
" " Ex. Coupon			@
Mariposa Gold Loan con. 7s			@*100½
Total sales		$249,000	

* Nominal.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, July 27, 1876.

WE note a slightly increased activity in this market, the total transactions footing up 36,421 shares, against 29,277 shares, as sold during the previous week. The quotations do not call for special comment, having been generally firm during the week, and closing, in the majority of instances, a fraction lower, unless it is in the notable contrast which they exhibit, compared with the unsettled feeling prevailing in the shares of the coal-carrying companies, dealt in at the New York Stock Market.

Pennsylvania Railroad.—20,535 shares comprise the transactions in this stock for the last six days, the quotations ranging between 52¼ and 53, closing at 52¾, which is an advance of ⅛ from the final price in our issue of the 22d.

Reading Railroad.—This stock continues steady, closing ⅛ lower, with sales amounting to nearly 0,000 shares.

Lehigh Coal and Navigation Company's stock has changed hands to the extent of nearly 7,000 shares, closing at 43⅜, just a point below the quotation of the previous week.

Bonds.—The transactions in these have been without special feature, the aggregate sales amounting to $71,000.

The Fulton Coal Company has declared a dividend of 3 per cent., payable on the 28th inst.

East Penn Iron Company.—At the recent meeting of this company, the following officers were elected to serve for the ensuing year: President, JULIUS C. SLACHTER; Directors, WILLIAM L. GRIM, WILLIAM R. MILLER, A. H. K. VON BLANKENSTEIN, WILLIAM H. GARDINER; Secretary, BENIAMIN HELFRISH; Treasurer, FRANK BROWNBACK.

Quotations and Sales of Stocks and Bonds.

For the week ending July 27, 1876.

STOCKS.

	Highest	Lowest	Closing	Shrs
Lehigh Valley RR. Co	57⅝	57⅜	57½	304
Pennsylvania RR.	53	52¼	52¾	2,533
Reading RR.	44¼	44	44	8,582
Lehigh Coal and Nav. Co	44⅝	43⅛	43⅞	6,815
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	*2½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	85	—
St. Nicholas Coal Co.	—	—	*1	—
Cambria Iron Co.	15	16	15½	185
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	70½	—
Total shares sold				36,121
Sales for the week previous				29,977
Increase				7,144

* These quotations are nominal.

BONDS.

	Sales.	Price
H and B. T. RR. 1st mortgage, 7s	—	@107¾
" " " 2d " "	—	@105
" " " 3d " cons	—	@ 45
Lehigh Valley RR. Con. mtg. 6s	19,030	99⅝@ 99¾
" " " 7s, 1910	—	@113
" " " 6s Reg.	2,00	@109
" " " C. M. 6s 1923	—	@ 99¼
Pennsylvania RR., 1st mtge. 6s	3,000	@104½
" " gen. " con. 1910	—	@104
" " gen. " 6s, reg.	2,000	@106¼
" " Cons. M. 6s reg.	—	@ 93
Phil. & Reading RR. 7s '93	—	@107
" " G. M. 7s, reg.	1,000	@106
" " " 7s con.	2,000	@107¼
" " new convertible 7s	25,000	100@101¼
" " 6s 43-80	500	@101
" " debenture 6s	1,000	@ 76⅛
Phil. & Reading C. & I. Co. Deb. 7s	—	@—
" " Locust Mount. tract	—	@ 80
Lehigh Coal & Nav. Co., 6s '84	7,500	@103
" " " RR 6s, '97	1,000	103 @104½
" " " cov m. 7s	—	@—
" " " 6s gold loan	1,300	103¼@103¾
Penn. Canal, 6s	4,000	@ 72¾
Penn. and N. Y. Canal, 7s	—	@109
Ches. and Del. Canal, 6s	1,500	@ 80
Susquehanna Canal, 6s	—	@ 70
Delaware Division Canal, 6s	—	@—
Susquehanna Coal Co. 6s	—	@ 77
Buck. Mount Coal Co. 6s	—	@—
Penn. Gas Coal Co. 6s	—	@—
Honeybrook Coal Co. 7s	—	@—
Total amount of sales	$71,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, July 27, 1876.

Very little change in the copper market for the week ending to-night; and, on the whole, the market holds its own well. Allouez has declined to $6, 25 shares having been sold at that figure yesterday, and this including an assessment of $5 per share. About three months ago the stock was selling in the neighborhood of $20. Calumet steady at 160⅝; Copper Falls 75 sold at 3, this week, and same bid. Duncan Silver is strong at 1¼, bid. National firm at 1¼, bid, and very little stock offering. Quincy is a shade off, 45½ being asked, against 47½ one week ago. In the small coppers there is nothing doing; but this, in fact, may be said of the whole list. Copper stocks hold their own fully as well as any stocks on the list.

Description.	Par Value.	No. of Shares.	Closing. Bid.	Asked.
Allouez	$50	20 600	$ 6 00	$ 6 50
Calumet and Hecla	25	80,000	160 00	160 62½
Central	25	20,000	30 00	31 00
Copper Falls	50	20,000	3 00	3 25
Dana	25	20,000	8	12½
Franklin	25	20,000	10 00	11 00
Humboldt	25	20,000	9	12½
Madisca	25	20,000	25	30
Mesnard	25	20,000	30	40
Minnesota	25	20,000	1 50	2 00
National	25	20,000	1 12½	1 37½
Osceola	25	40,000	21 00	22 00
Petherick	25	20,000	40	50
Pewabic	25	20,000	2 75	3 50
Phenix	25	20,000	12 25	12 75
Quincy	25	20,000	45 25	45 50
Ridge	25	20,000	4 25	4 75
Rockland	25	20,000	25	30
International Silver	20	60,000	10	12½
Star	25	20,000	37⅜	50
Superior	25	20,000	10⅞	12½
Duncan Silver	20	60,000	1	1 60

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, July 28, 1876.

Advices from the San Francisco stock market dated yesterday indicate, with but few exceptions, a continued improvement in mining shares. Some of the quotations advancing $5 and $3 per share.

Consolidated Virginia. This stock is $2 lower. A reputable local authority on the Pacific slope holds the following views in regard to this Company:—"Though the stockholders have received already $21,650,000 in dividends there is a vast mountain of ore still left above the 1550-feet level. And what is below? The drift from the 1700-feet level of the Gould & Curry will develop the ore body 200 feet lower than the present lowest level, and there is hardly room to doubt that the ledge will be found to extend to that depth as rich, if not richer, than it is above. A cross cut from the lowest drift is now coming in to connect with this winze, and with the improved ventilation thus secured the work of development will be rapidly pushed. The men who know most about the probabilities of ore supplies are investing millions of dollars in quartz mills. They must be tolerably certain that they are going to have something for those mills to crush for a year or two." All these reports about the continuation of the bonanza, are vague the steady decline in Consolidated Virginia shares would seem to be based on some more substantial cause than mere stock jobbing.

From the *Commercial Herald* we take the following showing the ore product, average per ton and aggregate bullion value produced by this mine during the first six months of the present year:

	Total tons.	Aggregate bullion product	Average per ton
January	15,899	$1,352,464 05	$85 12
February	21 627½	2,831,930 44	130 94
March	21,040¼	3.123,999 76	148 47
April	15.922¾	1.838,7 8 51	115 50
May	13 465	882.783 82	65 56
June		609,002 30	
Total	87,954¾	$10,638 968 88	$114 03

The above figures were compiled from official statements at the Consolidated Virginia office for the information of our readers showing the ore sent to the mills from January to the close of May, commencing with the week ending January 8th, and then followed out by successive weekly reports, and the total bullion for each month to the close of June

This shows a large production of ore and bullion, the average per ton for the whole period of five months running very high as will be noticed above, being $114.03 per ton. Given by months the above is not quite correct, as the ore account was taken from each weekly return without reference to the exact amount required to produce the total bullion reported for each fiscal month, but the aggregate for the six months, with the exception of the ore account for June, is entirely correct so far as we could determine it from the reports, that being the only source of information. We also learned that California shipped the first lot of bullion on April 14th, showing a product of $1,430,000 for that month, $1.3 3 360 for May, and in June the bullion account reached $1,477,960. We found partial returns of the number of tons of ore sent to the mills during the months of April and May, but no mention of the ore was made in any of the June reports, consequently we cannot give the approximate bullion value per ton.

California.—This stock is $1 per share reduced lower. The mine is yielding its usual quantity of ore.

Belcher is steady. The *Chronicle* of the 12th inst., says: "A draft was made at the Belcher Mine yesterday, and seventy-five men dropped from the roll. The reason for this shortening of the working force is doubtless the depreciation of silver. Ten per cent. discount added to the burden of bullion tax and other expenses, leaves no margin for profits on such low-grade ores as form the bulk of the product of most of the mines. The outlook at the present time is very gloomy."

The Sutro Tunnel at last advices was in 13,800 feet Face of header in favorable working vein matter, and the regular weekly advancement is from sixty to one hundred feet.

Consolidated Imperial is unchanged. Vigorous work is being done in the 1,940 feet level, and a drift will be started there to connect with the Yellow Jacket claim. Conflicting reports are in circulation with reference to the finding of rich ore.

The Centennial Reduction Mill, of Virginia City, Nev., is being steadily run on blanket and table washings, reducing from eighteen to twenty tons of sulphurets per day, which assay from $30 to $43 per ton and are worked up to sixty per cent. of their assay value.

"American Mining Board" of New York.—On the 10th of August, the first meeting of this new organization, will be held in the Drexel Building, and the permanent officers elected. It is understood that there are more than ninety names on the roll, some of which represent strong California and Nevada houses, who feel an interest in the movement and expect to see in the East an eventual development of speculative business in silver and gold mining such as has been frequently observed on a larger scale at the San Francisco boards

INCORPORATIONS.

We note the recent organization of the following companies, with their location and share capital, in addition to the announcements in our issue of the 24th ult.

Name of Company.	Location.	Cap. Stock.
Defiance Mining Company	California	$10,000,000
Loretta Mining Co.	"	10,000,000
Panamint Consolidated Mining Co.	"	6,000,000
Lone Star Eclipse Con Mining Co	"	6,000,000
Emigrant Silver Mining Co.	"	5,00 ,000
Idaho Silver Mining Co.	"	5,000,000
New Coso Silver Mining Co.	"	10,000,000
Sagamore Gold and Silver Mining Co.	"	2,000,000
Loyal Lead Gold Mining Co.	"	5,000,000
Seaton Gold Quartz Mining Co.	"	5,000, 00
Empire Mining Co.	"	5, 00,000
Healdsburg Ore Paint Co.	"	1, 00,000
Fountain Head Gravel Mining Co.	"	400,000
Hays Silver Mining Co.	"	5,000 000
El Tesoro Silver Mining Co.	"	10,000,000
Eureka Paris Milling and Mining Co.	"	1,000,000
Alaska Gold Mining Co.	"	2,500,000
Star Oil Works Co.	"	1,000,000
East Modoc Coal Mining Co.	"	5,000,000
Derwent Gold Mining Co.	"	5,000,000
East Justice Mining Co.	Nevada	$10,000,0 0
Segregated Europa Mining Co.	"	10,000,000
Houston Mining Co.	"	10,000,000
Plato Gold and Silver Mining Co.	"	1,000,000
Mutual Benefit Mill and Mining Co.	"	10, 00,00
E. Crown Point Gold & Silver Min Co.	"	10,000 000
Loni Mining Co.	"	10,000,000
South Park Smelting Co.	Colorado	200,000
Pacheco Mining Co.	Various	3,000,000
Metrach in Consolidated Mining Co.	Arizona	2,000, 00
Consolidated Silver Mining Co. of Maine.	Various	1,000,000
Kentucky Lead Mining Co.	Green Co., Ky.	
Middlesex Iron Co.	Pennsylvania	
Ridgway Coal Co.	Ohio	$40,000

The San Francisco Mint Gold and Silver Coinage during the past fiscal year, ending with the 30th ult., and as compared with the year previous, was as follows:

	1874-75.	1875-76.
Gold coinage	$26,200,000	$27,036,500
Silver coinage	4,327,000	8,953,000
Total gold and silver	$30,527,000	$35,980,500

Increase over last year, $5,462 500.

San Francisco Stock Exchange Sales.—Following are the figures for the first six months of 1873, 1874, 1875, and 1876 showing the aggregate transactions in mining shares covered by this period:

Month.	1873.	1874.	1875.	1876.
January	$9,185,20	$28,513,74	$42,563,47	$28,101,785
February	9,540,43	16,365, 2	10,435,535	17,504,105
March	12,931,96	17,080,24	15,737,64	3 ,925,385
April	9.937,134	16,78 , 10	14,637,50	20,736,485
May	15,493,355	12,213,035	19 949,615	10,788,195
June	11,236,249	14,627,10	12,641,48	12,943,440
Totals	$68,540,548	$105,583,36	$124,985,25	$125,999,395

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	July 20.	July 27.
Sierra Nevada	3,300	100,000	$14	$15
Union Consol'd	600	100,000	11	14
Mexican	600	108,000	29	31
Ophir	675	108,000	46	46
California	600	540.000	61	60
Consol'd. Virginia	710	540,000	58	56
Best & Belcher	540	100,800	45	47
Gould & Curry	612	100,800	15	16
Savage	771	112,000	18	19
Hale & Norcross	400	112,000	8	10
Chollar Potosi	1,400	28,000	71	79
Alpha Consol'd	306	30,000	38	39
Imperial Con.	468	500,000	5	5
Yellow Jacket	957	120,000	25	26
Kentuck	95	30,000	11	11
Crown Point	541	100,000	10	10
Belcher	1,040	104,000	17	17
Overman	1,200	38,400	67	70
Caledonia	2,188	100.000	9	9
Justice	2,100	105,000	21	24
Raymond & Ely	5,000	30,000	8	8
Meadow Valley	4,400	60,000	1	1
Eureka Consolid.	....	50,000	1⅞	11
Eureka G. V.	1,680	20,000	3	3
Silver Hill	5,400	54,000	7	6
Julia	3,000	110,000	8	8

Gas Stocks.

NEW YORK, FRIDAY EVENING, July 28, 1876.

In the gas stock market a few shares of the Harlem Company have been sold during the week at 115.

The Metropolitan Gas Company has declared a cash dividend of 5 per cent. on stock, and 3½ per cent. on the scrip, payable August 1.

The Brookline, Mass., Gas Company has declared a dividend of 3½ per cent.

Chicago Gas Company.—A resolution has been introduced into the Board of Alderman in this city, instructing the Board of Public Works to substitute three-feet burners on all lamps in actual use throughout the city. Referred to the Gas Light Committee. The *Inter-Ocean* of the 21st inst., says: "Mr. BILLINGS and Mr. WATKINS, of the gas companies, were at the City Hall yesterday looking after the interest of their companies. They claim that it is not possible to sell gas any cheaper than the old rates ($2.50 per 1,000 feet), and that the expenditures they have in laying pipes in thinly-peopled districts, are not equalled by the returns; and that gas companies, like everybody else must live. When the people heard this argument last Fall, they bought and burned kerosene."

Peoples' Gas Company, Rutland, Vt.—The Directors of this company have voted to reduce the price of gas fifty cents per 1,000 feet. At present, three-fourths of the places of business in Rutland are lighted with kerosene.

The St. Louis Gas Troubles. OLIVER A. HART, President of the St. Louis Gas Light Company, has sent a communication to Mayor OVERSTOLZ, which he desires to be presented to the City Council, offering to compromise all the differences between that company and the city, to furnish gas to consumers at $2.50 per 1,000 feet, and carry out all the conditions of what is known as the "tripartite agreement," the city to dismiss all pending suits against the company, pay all bills due the company, and return the gas-works to them. Mayor OVERSTOLZ declines to submit the communication to the Council, and states that the questions at issue are not of a nature to be compromised; that the courts have sustained the position of the city, and that the city government has no authority to compromise the matter. The courts must, in the nature of the case, settle all differences between the city and the gas company.

The Marquette, Michigan, Gas Light Company, propose to light the 46 street lamps in that city and keep them in repair (the same being first put in repair at the expense of the city) for one year from 1st of July observing the regular schedule time for lighting and extinguishing the same at 12 o'clock midnight, for one hundred and twenty-six and 50-100 dollars ($126.50) per month. Gas will be furnished for city council room at the price charged other consumers, and bills rendered by the register of the meter to be paid monthly on same tons as above.

It is understood that all lamps are to be lighted at the hour directed by schedule, and all are to be extinguished at 12 o'clock midnight. The above proposition on being submitted to the Board of Aldermen was accepted.